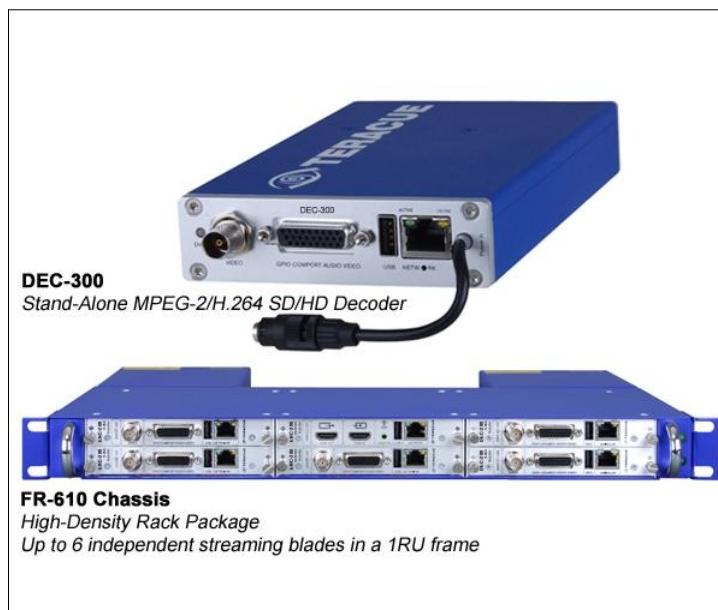


DEC-300™ H.264 AND MPEG-2 SD/HD DECODER



User Guide V1.3

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Thank you! Mail to: documentation@teracue.com

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I. Information about the manual



This document is designed to help users setup, configure and work with the H.264/MPEG-2 SD/HD decoders.

If you received this publication as a PDF, then it's a good idea to print it out for future reference.

It is best to use this user guide directly in front of your computer, by doing so you try out everything at once.

.!. **Important features are marked by this sign.**

II. Release Notes

Following are the Features listed which are supported from the firmware versions:

Version 2.06_w18 (2013-12-04)

- BUGFIX: DEC-300 freezes after several hours when caching buffer is set to middle or high
- allow hostnames with NTP server setting

Version 2.05_w18 (2013-10-14)

- BUGFIX(?): removed potential deadlock for UDP networking
- Busybox NTP support (static/dhcp)
- Save system clock to realtime clock once a day

Version 2.04_w18 (2013-10-09)

- BUGFIX: avoid/minimize audio output lockups
- BUGFIX: Make 1st network authentication packet come through
- Removed additional restart on TCP resyncs
- Don't disable DNS resolver when changing form DHCP to static IP.

Version 2.03_w18 – 2013-08-23 09:30

- BUGFIX: Support for "intel accelerated" transcoded streams

Version 2.02_w18 – 2013-08-21 06:10

- Fix problem: Loading different presets crashes decsv
- Fix problem: System freezes when sine is played after video
- Ieee802.1x support
- Hostname lookup

Version 1.31_w18 – 2013-08-03 12:05

- Fix problem: Swap audio channels when recovering from error
- In UDP unicast mode use 0.0.0.0 to accept any source

Version 1.30_w14 – 2013-01-24 11:30

- SNMP support

Version 1.20_w14 – 2013-01-11 18:55

- SYSTEM/PASSWORD: change fixed
- DECODER/AUDIO: Talkback rate option 16000 added
- Info icons added
- Show OSD on startup and when factory reset hw button is pressed shortly
- DECODER/SOURCE: New protocol added RTP, RTP/FEC (See Rights in SYSTEM/SETTINGS); When 'RTP/FEC' is selected: 'FEC Dimension' option added
- SYSTEM/SETTINGS: Right show added, about FEC Rights: If FEC Permission = enabled, DECODER/SOURCE: Protocol 'RTP/FEC' is available
- FIX: Equal end-to-end delay for VES and TS low delay
- Improve overall system stability
- Tuning of TCP connection parameters
- Hold two buffers less in low latency mode
- Don't look for stream errors and let DSP codecs arrange error cases

Version 1.15_w12 – 1.20_w13 – Internal Versions

Version 1.14_w12 – 2012-10-25 17:00

- DECODER/AUDIO: 'Talkback Stereo' check box added

Version 1.14_w11 – 2012-10-19 13:16

- Fix problem: color bar and blank screen did not show up every time.
- Broadcast "minimal" SAP
- Support for audio options: input mute, output mute and input gain, output gain

- Stereo talkback
- Display of aspect ratio
- NTSC is working now
- Eliminated "spike" artefacts
- Add talkback sample rates 22.05kHz, 12kHz and 6kHz for better ENC-300 support
- DHCP support
- CVBS support
- Add framerate conversion (double and half)
- DECODER/XPLAYER: XPLAYER link works in other browsers with XPlayer_v.4.0.0.9
- DECODER/SETTINGS: OSD Active disabled , StreamLoss Display options HOLD->FREEZE, BWTEXT->TEXT renamed
- DECODER/TRANSPORT: Receive Buffer enabled
- DECODER/AUDIO: Talkback IP info added, Info Text = "Enter 0.0.0.0 in Talkback IP to disable talkback"
- DECODER/VIDEO: Aspect ratio: Removed
Format: AUTO = AUTO (YPbPr)
1080i60
1080i50
720p60
720p50
PAL = 576i50
NTSC = 480i60
AUTO_CVBS = AUTO (CVBS)
PAL_CVBS = PAL
NTSC_CVBS = NTSC
- DECODER/SOURCE: Fix invisible field problem: IP address when in TCP/Server mode
- Blue-Info-Box: 'Video Continuity Errors' added (video pids only)
IE9 align fix

Version 1.10_w06 – 1.13_w10 – Internal Versions

Version 1.09_w06 – 2012-08-27 16:17

- Decoder/Settings: OSD Active added
- Decoder/Transport: Program Number, Video PID, Audio PID adjustable
- Decoder/Video: Aspect Ratio added
- Decoder/Audio: Talkback IP, Talkback Port, Talkback Rate, Audio Input, Linein Gain, Micin Gain, LineOut Gain, Output Mute added
- Decoder/Source: Transport Protocol (TCP/Server, TCP/Client) added
- Comport/Settings: Mode, Destination, Bitrate Databits Parity Stopbits added

Version 1.04_w05 – 1.09_w05 – Internal Versions

Version 1.03_w05 – 2012-07-18 12:33

- Decoder/Video: Format, Output options added (note: output only COMPONENTS)
- Decoder/GPIO: Mode, GPO-Value, Destination, GPI-Value added (for testing)

Version 0.98_w04 – 1.02_w05 – Internal Versions

Version 0.97_w04 – 2012-07-05 08:36

- Decoder/Settings: LowLatency, StreamLoss added
- Decoder/XPlayer: XPlayer link updated

Version 0.93_w02 – 0.96_w04 – Internal Versions

Version 0.92_w02 – 2012-10-25 13:15

- Fix 'Save' button problem
- Network set fixed
- Blue-Info-Box: labels modify (Codec, Video bitrate, Encoder Status, Video resolution, Uptime, Video framerate, Stream Locked, Source, Transport Rate, Received Bytes, Stream mode)

Version 0.92_w01 – Internal Version

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1. Overview

The DEC-300™ is a professional compact H.264 SD/HD and MPEG-2 SD/HD video/audio stream receiver and IPTV decoder. It is designed for network IP video system integration. As an output decoder device for streaming media it provides easy access to DVB IP and IPTV streams on HD-SDI and analog video outputs.

DEC-300™ decoders incorporate low-latency compression technology and professional signal processing, creating full resolution video output in HD resolution. To access the intuitive graphical user interface use your standard web browser from any PC on the network. Remote network configuration is also supported over SNMP*, by Telnet and by control over the local COM port.

Multiple DEC-300™ blades are operated inside the FR frame series. The decoder is also available as a chassis-based compact device ('PORTABLE'). High-density requirements are solved by operating the DEC blades in the FR-2000-24 (4 RU rack mount) or FR-610 (1 RU rack mount) multi-channel racks. Different types of DEC decoder blades, ENC encoder blades and DVB/IP videogateways can be "mixed and matched" inside the FR-frame series.

DEC-300™ combines high-performance with unparalleled simplicity in a compact Ethernet video decoding appliance designed for commercial, institutional, and industrial applications such as:

- Broadcast & CDN IP contribution
- Wireless & mobile streaming
- Digital signage streaming
- IPTV/OTT streaming
- Medical & campus TV
- Telemedicine
- Security monitoring
- Stadium & event TV
- Training & research
- Video monitoring
- Control rooms & command centres

2. General Information

DEC-300™ can be ordered as blade-based units or as chassis-based devices. Please specify at your order which DEC-300™ type (blade-based or chassis-based) do you exactly want.

DEC-300™ blade-based units can be used in the FR-610 multi-channel chassis, which can hold up to max. 6 Teracue blades. Inside the FR-610 chassis different types of ENC encoder blades, DEC decoder blades can be 'mixed and matched'.

DEC-300™ chassis-based devices are fixed implemented in a chassis. The chassis-based devices are called DEC-300™ PORTABLE. So you do not need purchase a chassis separately.

All equipment (like the FR-610 chassis) and DEC-300™ accessories are handled as model options and need to be purchased separately.

2.1 Unpacking the Decoder

When you unpack the ordered equipment, please make sure that all the equipment is complete.

2.1.1 DEC-300™ blade-based units

Normally the DEC-300™ blades are pre-fit into the according chassis that the decoders have been ordered with.

If DEC-300™ blades are ordered and shipped separately, please be careful when handling the blades. Be sure to avoid electrostatic influence when touching the blades.

After unpacking, your DEC-300™ should include the following:

- 1 x Teracue DVD which includes this user guide
- 1 x DEC-300™ MPEG-2/H.264 HD Decoder blade
- 1 x Breakout cable 'S'

2.1.2 DEC-300™ chassis-based devices

After unpacking, your DEC-300™ should include the following:

- 1 x Teracue DVD which includes this user guide
- 1 x DEC-300™ MPEG-2/H.264 HD Decoder (chassis-based)
- 1 x Breakout cable 'S'

2.2 Setting up the Decoder and Safety Instructions

Always read the instructions carefully and keep this user guide for future reference.

Please choose a suitable location for operating the decoder(s).

The DEC-300™ should not be exposed to the following:

- Moist and dusty environments.
- Air humidity above 80%.
- Avoid extreme vibrations or shocks.
- Direct sunlight and extreme heat.
- Temperatures below 0°C and above +65°C.
- Avoid quick and dramatic temperature changes.

.!. Please set up the decoder on a reliable and flat surface when using the chassis-based device or mount in a rack, when using the FR-610 chassis.

2.3 Connecting the Decoder (chassis-based)

Please pay attention about the cabling order between the power supply and the FR-chassis. Connect at first always the connector of the power supply to the FR-chassis.

The cable connector can be locked to the socket of the decoder, so the cable cannot accidentally be pulled out.

After you have connected the connector of the power supply to the chassis, please connect the power cable to the power supply.

As next, please connect the network cable to the network interface and connect your display unit to the video output of the DEC-300™. Concerning of the video output you have the choice between different video signal types. The DEC-300™ supports SD/HD-SDI (with embedded audio), Composite, S-Video, YPbPr and RGB signals. If you need a Composite (CVBS), S-Video (YC), YPbPr or a RGB signal, please use the Sub-D 26-pin connector via the breakout cable. If you need a SD/HD-SDI signal, please use the BNC connector.

If you want use analogue audio, please use the Sub-D 26-pin connector via breakout cable.



Figure 1: DEC-300™ front side

Front panel connection:	Description:													
DIAG:	LED status indicator. The LED indicates the status (operational state) of the DEC-300 decoder. The status is indicated by the LED colour and LED flashing (blinking) speed. <table border="1" data-bbox="616 1253 1378 1462"> <thead> <tr> <th>LED status:</th><th>Description:</th></tr> </thead> <tbody> <tr> <td>Constant green:</td><td>OK, decoder in operation, decoding video.</td></tr> <tr> <td>Flashing green:</td><td>OK, but stream input signal is missing.</td></tr> <tr> <td>Flashing red:</td><td>Network error. Decoder cannot send data packets.</td></tr> <tr> <td>Constant red:</td><td>General error.</td></tr> <tr> <td>No LED light:</td><td>Check power and power supply.</td></tr> </tbody> </table>		LED status:	Description:	Constant green:	OK, decoder in operation, decoding video.	Flashing green:	OK, but stream input signal is missing.	Flashing red:	Network error. Decoder cannot send data packets.	Constant red:	General error.	No LED light:	Check power and power supply.
LED status:	Description:													
Constant green:	OK, decoder in operation, decoding video.													
Flashing green:	OK, but stream input signal is missing.													
Flashing red:	Network error. Decoder cannot send data packets.													
Constant red:	General error.													
No LED light:	Check power and power supply.													
Video:	Video Output for SD/HD-SDI (with embedded Audio) via BNC interface.													
Video Audio Comport GPIO:	Audio-, Video- and Data Output/Input for Composite, S-Video, YPbPr, RGB, H- and V-Synchronisation, Audio-In, Audio-Out, GPIO, RS-232/422, via Sub-D 26 pin interface.													
USB:	USB-interface.													
Network:	Standard 10/100Mbit/s Ethernet via RJ-45													
Power in:	Power cable with connector for the power supply..													

Table 1: Description of the connectors on the DEC-300™ front side

2.4 Assignment of the Sub-D 26-pin Connector

Table 2 describes the assignment of the Sub-D 26-pin connector which is on the front side of the DEC-300™.

Pin:	Sub-D 26-pin Connector Assignment:
1	TxA
2	TxB (RS-232 TxD)
3	GPO-A (Relay A)
4	Audio In R
5	Audio Out R
6	NC
7	Video Out P _b / Y
8	Video Out CVBS / Y
9	Video Out / P _r / C
10	GND
11	GND
12	GPO-B (Relay B)
13	GPI-C
14	GND
15	GND
16	GND
17	GND
18	GND
19	RxB
20	RxA (RS-232 RxD)
21	GPI-A
22	Audio In L
23	Audio Out L
24	3V3
25	GND
26	NC

Table 2: Assignment of the Sub-D 26-pin Connector

CVBS = FBAS = Composite Signal
YC = S-Video Signal
NC = not connected
* = is not supported at the moment

2.5 Breakout Cable 'S'

For the DEC-300™ it exists two different breakout cables which are called **Breakout cable 'S'** and **Breakout cable 'P'**. The Breakout cable 'S' is the standard breakout cable and Table 3 describes the provided signals.

Signal:	Connector Type:
Audio In R + L	Mini Jack 3,5 mm
Audio Out R + L	2 x Cinch (RCA)
Video CVBS	Cinch (RCA)
Video YC	Mini-DIN 4-pin (Hosiden)

Table 3: Breakout cable 'S'

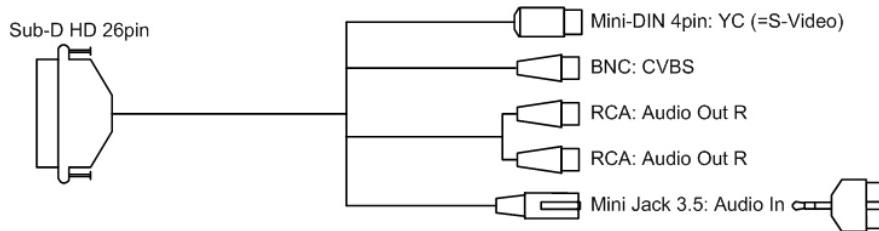


Figure 2: Breakout cable 'S'

2.6 Breakout Cable 'P'

For the DEC-300™ it exists two different breakout cables which are called **Breakout cable 'S'** and **Breakout cable 'P'**. The Breakout cable 'P' is the professional breakout cable and Table 4 describes the provided signals.

Signal:	Connector Type:
RS-232/422	Sub-D 9-pin
GPIO	Sub-D 9-pin
Audio In R + L	2 x Cinch (RCA)
Audio Out R + L	2 x Cinch (RCA)
Video CVBS / YC / YP _b P _r	3 x BNC

Table 4: Breakout cable 'P'

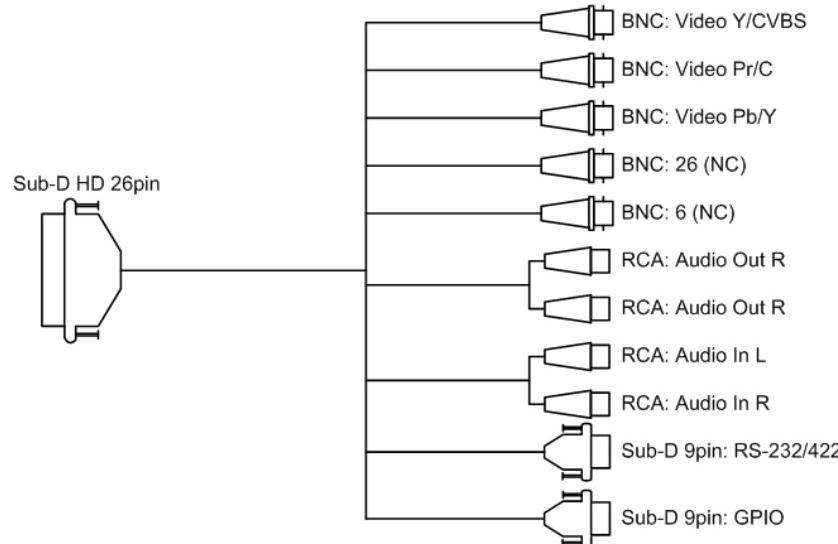


Figure 3: Breakout cable 'P'

CVBS = FBAS = Composite Signal
YC = S-Video Signal
NC = not connected
* = is not supported at the moment

3. DEC-300™ User Guide

This chapter gives you an overview over DEC-300™ and demonstrates the decoder's main functions.

- .!. Before proceeding please be sure that the decoder is setup correctly and all necessary connections are established.**

Working and configuring Teracue's decoders is very easy.

You do not need to install an application or remote configuring software. If you know how to browse the internet, then you already know how to access and control the decoders, simply via web-browser.

3.1 Accessing and Configuring Decoders

Open your standard web-browser and type in the decoder's IP-address (e.g. '172.16.20.200') in the address field and press the 'Enter' button.

- .!. If you haven't changed the factory presets and if not specified elsewhere in the shipment the decoder's IP-address will by default be set to: 172.16.20.200.**

Default IP-address: 172.16.20.200
Login username: admin
Login password: admin

- .!. The decoder is configured by factory default to automatically start the decoding process and displaying the stream of the multicast address 239.252.20.100, when a network link and a link to the display unit are established.**
- .!. To be able to login to the decoder's user interface, your computer has to be in the same IP-address range (subnet).**

You briefly might have to change your computers IP-address to be in the same subnet as the decoder. Only then you will be able to access the decoder and change the decoder's IP-address, and of course afterwards change your computer's IP-address back.

3.2 Login

After typing the IP-address of your DEC-300™ into the browser and hitting enter, a login screen should appear. See Figure 4.

Enter your username and password and click on 'login'.

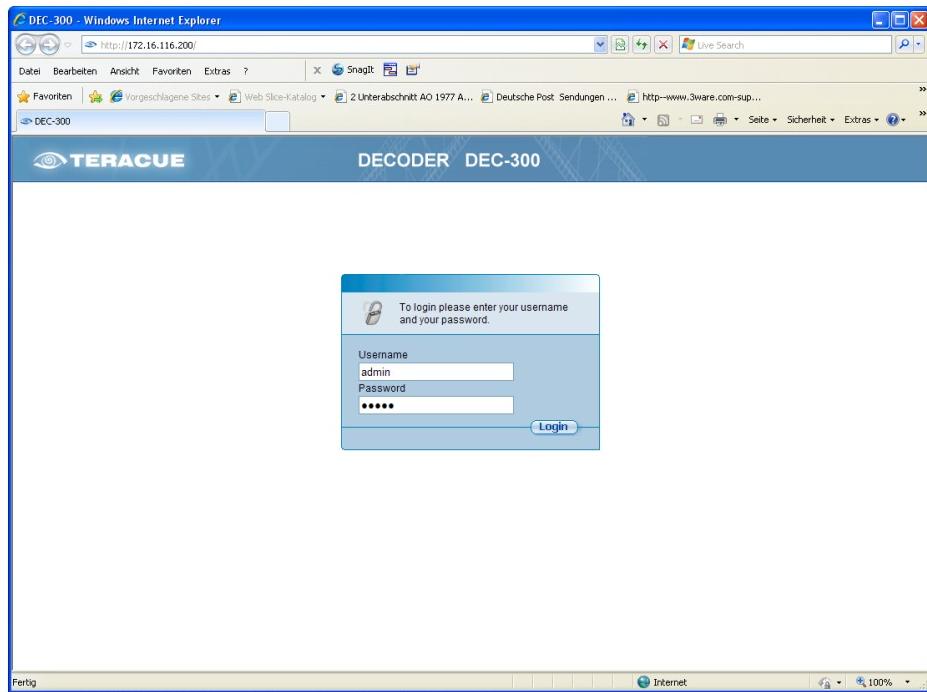


Figure 4: DEC-300™ web interface 'Login Page'

Default IP-address: 172.16.20.200
Login username: admin
Login password: admin

3.3 Graphical User Interface of the DEC-300™

3.3.1 Navigational Menus

After successful login you have access to the decoder's configuration. All of the settings can be adjusted via web-browser.

Main Menu:

The main menu contains the 'DECODER', 'NETWORK', 'COMPORT', 'SYSTEM', 'HELP' and 'LOGOUT' links from the top bar. See

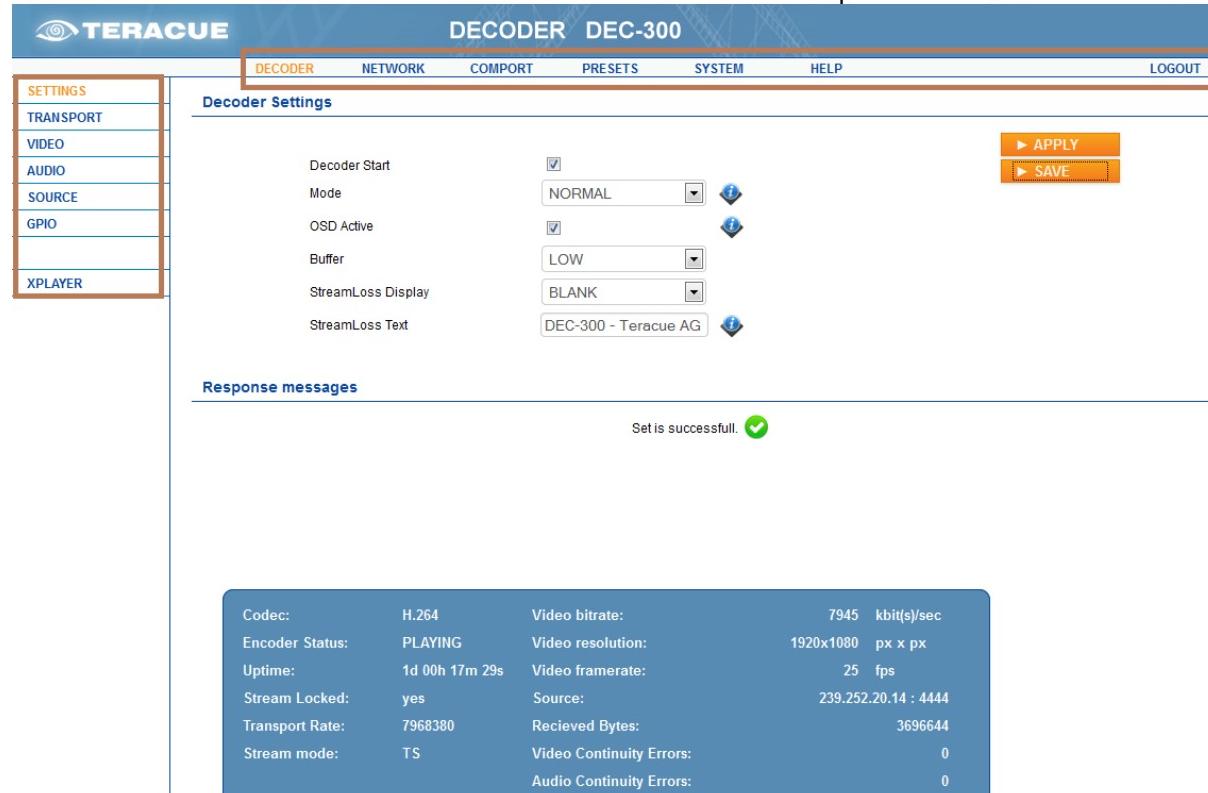


Figure 5.

Secondary Menu:

After selecting the desired menu item from the main menu, choose an area for configuration from the secondary menu, which is resides on the left-hand side. See

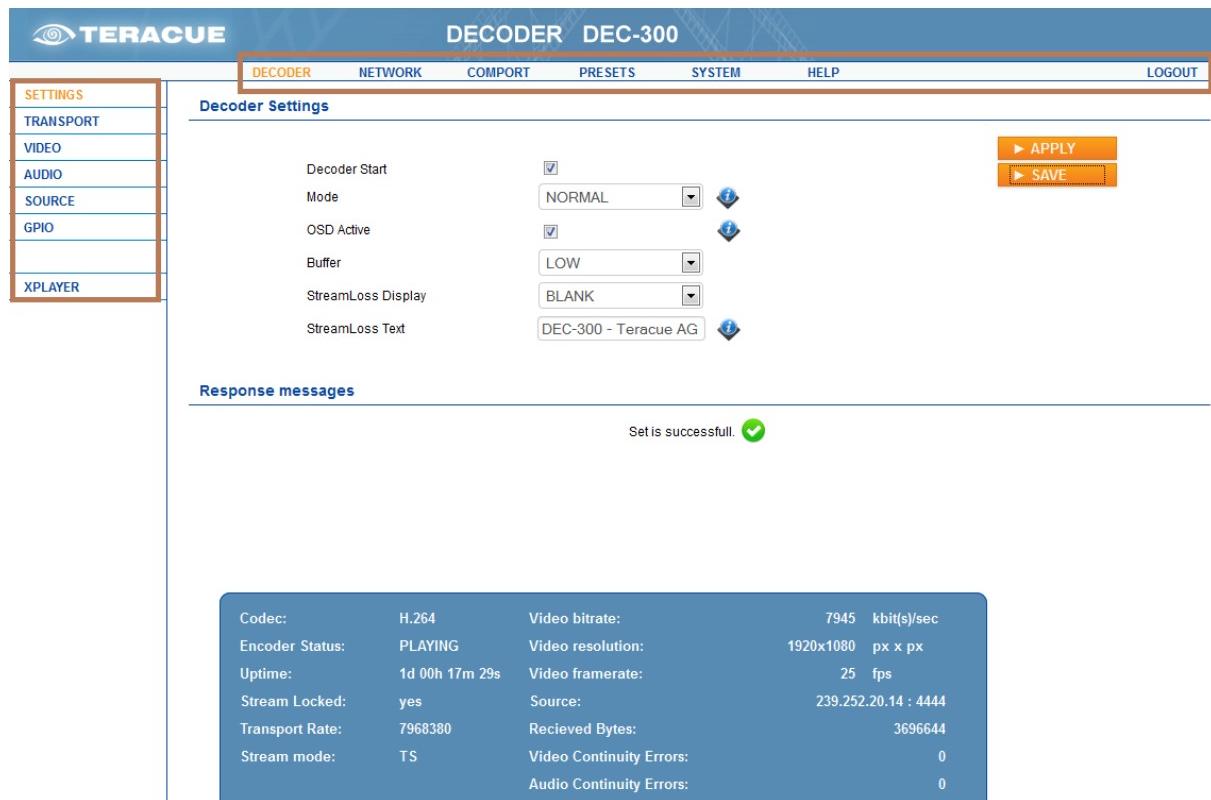


Figure 5.

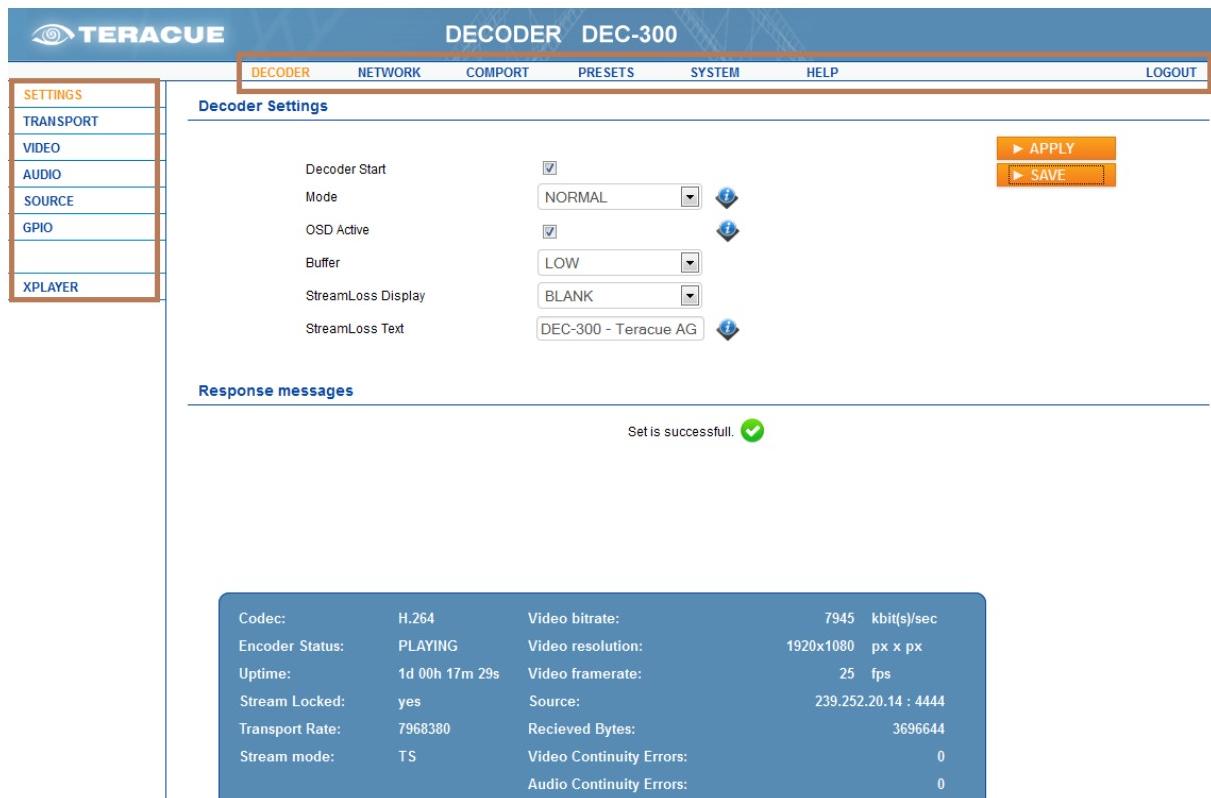


Figure 5: Settings of the DEC-300™

3.3.2 ‘APPLY’ and ‘SAVE’ Buttons

► APPLY

A change or multiple changes of the configuration settings will only take effect after the ‘> APPLY’ button is pressed.

The decoder will then start working with the new parameters, but the parameters will not be saved to the decoder. Applied settings are not saved and will be lost after a reboot.

Good for quickly testing and applying different settings.

► SAVE

Same as the ‘> APPLY’ button, **but** the configuration parameters will be applied and saved to the decoders flash memory.

Saved parameters will be used by the decoder even when the decoder is turned off & on or after a reboot has taken place.

Good for permanently saving the decoder configuration.

3.3.3 Blue Info-Box

The blue Info-Box shows read-only state information for the user, see Figure 6. Table 5 contains the description of the blue Info-Box.

Codec:	MPEG2	Video bitrate:	4875 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	720x576 px x px
Uptime:	0d 00h 32m 54s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.11 : 4444
Transport Rate:	5594880	Received Bytes:	1373721076
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 6: Blue Info-Box of the DEC-300 webpages

Information:	Description:
Codec:	Shows the video codec of the input stream.
Encoder Status:	Shows whether the decoder is decoding or not.
Uptime:	Shows how long the decoder runs.
Stream Locked:	Shows whether the input stream is locked or not.
Transport Rate:	Shows the transport rate of the input stream.
Stream mode:	Shows the stream mode of the input stream
Video bitrate:	Shows the video bitrate of the input stream.
Video resolution:	Shows the video resolution of the input stream.
Video framerate:	Shows the video frame rate of the input stream.
Source:	Shows the specified source IP-address and port number.
Received Bytes:	Shows the bytes which the decoder has received.
Video Continuity Errors:	Shows the values of occurred video continuity errors.
Audio Continuity Errors:	Shows the values of occurred audio continuity errors.

Table 5: Description of the blue Info-Box of DEC-300 webpages



You can minimize the blue Info-Box by clicking at the blue Info-Box. Furthermore, the blue Info-Box minimizes itself automatically after five minutes. To maximize the blue Info-Box, please click at the arrow which is shown at the minimized Info-Box. The arrow is shown at the left of this text break.

3.4 Decoder Configuration

3.4.1 Menu: Decoder / Settings

Under the menu option ‘DECODER/SETTINGS’ you define the main operational state of the decoder. Here you can set decoding process to ‘On’ or ‘Off’. See



Codec:	H.264	Video bitrate:	7945 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 00h 17m 29s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	7968380	Received Bytes:	3696644
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 7.

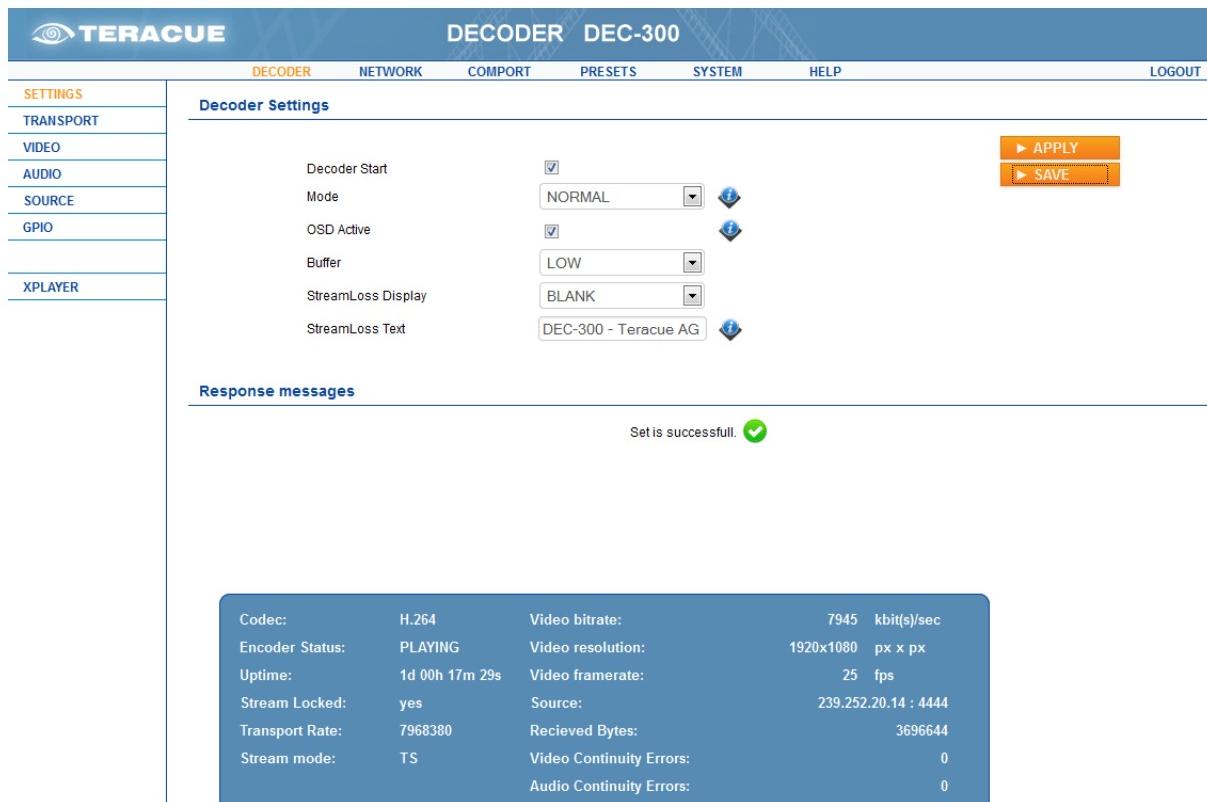


Figure 7: 'Decoder / Settings' page of the DEC-300™ decoder

Settings:	Description:
Decoder Start:	Stops or starts the decoding process.
Mode:	NORMAL / LOW DELAY The low delay mode and improves the audio video offset, if the source of the encoder has not a compliant audio video offset. !. The 'Low Latency' should be always enabled, if it is well-known that the used encoder has also a 'Low Delay' Mode (e.g. the ENC-200™) and the user wants the lowest delay.
OSD Active	If enabled, then the OSD is visible for 10 seconds when the DEC-300 is switched on.
Buffer	DEC Buffer for input signal. Selectable 'LOW / MIDDLE / HIGH'
StreamLoss Display:	If the video input stream is lost, you can choose here the screen which should be displayed instead of the video stream. If 'FREEZE' is chosen, the decoder displays the last video frame of the buffer as a frozen frame. If 'COLORBAR' is chosen, the decoder displays a colorbar. If 'TEXT' is chosen, the decoder displays a black screen which contains the display status message 'STREAM LOSS'.
Stream Loss Text	Free text field. Default: 'DEC-300 - Teracue AG'

Table 6: Description of the 'DECODER/SETTINGS' webpage of the DEC-300™

3.4.2 Menu: Decoder / Transport

In the 'DECODER/TRANSPORT' menu, you are able to specify which PIDs the decoder should receive. Table 7 describes the 'Decoder / Transport' page of the DEC-300™ decoder, see Figure 8.

PID stands for Packet Identifier. The PIDs help to identify and locate the elementary signals in a stream containing lots of different information and signals (audio, video and data). This is necessary due to the multiplexed nature of transport streams.



Figure 8: 'Decoder / Transport' page of the DEC-300™ decoder

Settings:	Description:
Program Number:	Specifies the program number. The DEC-300™ recognizes the manual mode by entering of the desired program number. To change back the automatically mode, enter in the text field the value '0' and confirm this entry with the 'APPLY' button.
Video PID:	Specifies the video packet identifier of the video which should be displayed (e. g. a stream contains several videos). The DEC-300™ recognizes the manual mode by entering of the desired video PID. To change back the automatically mode, enter in the text field the value '0' and confirm with the 'APPLY' button.
Audio PID:	Specifies the audio packet identifier of the audio which should be played (e. g. a stream contains several audios). The DEC-300™ recognizes the manual mode by entering of the desired audio PID. To change back the automatically mode, enter in the text field the value '0' and confirm this entry with the 'APPLY' button.
Program Number:	Displays the program number of the received stream. (Read only)
Video PID:	Displays the video PID of the received stream. (Read only)
Audio PID:	Displays the audio PID of the received stream. (Read only)
PCR PID:	Displays the PCR (Program Clock Reference) packet identifier of the received stream. (Read only)
PMT PID:	Displays the PMT (Program Map Table) packet identifier of the received stream. (Read only)

Table 7: Description of the 'DECODER/TRANSPORT' webpage of the DEC-300™

3.4.3 Menu: Decoder / Video

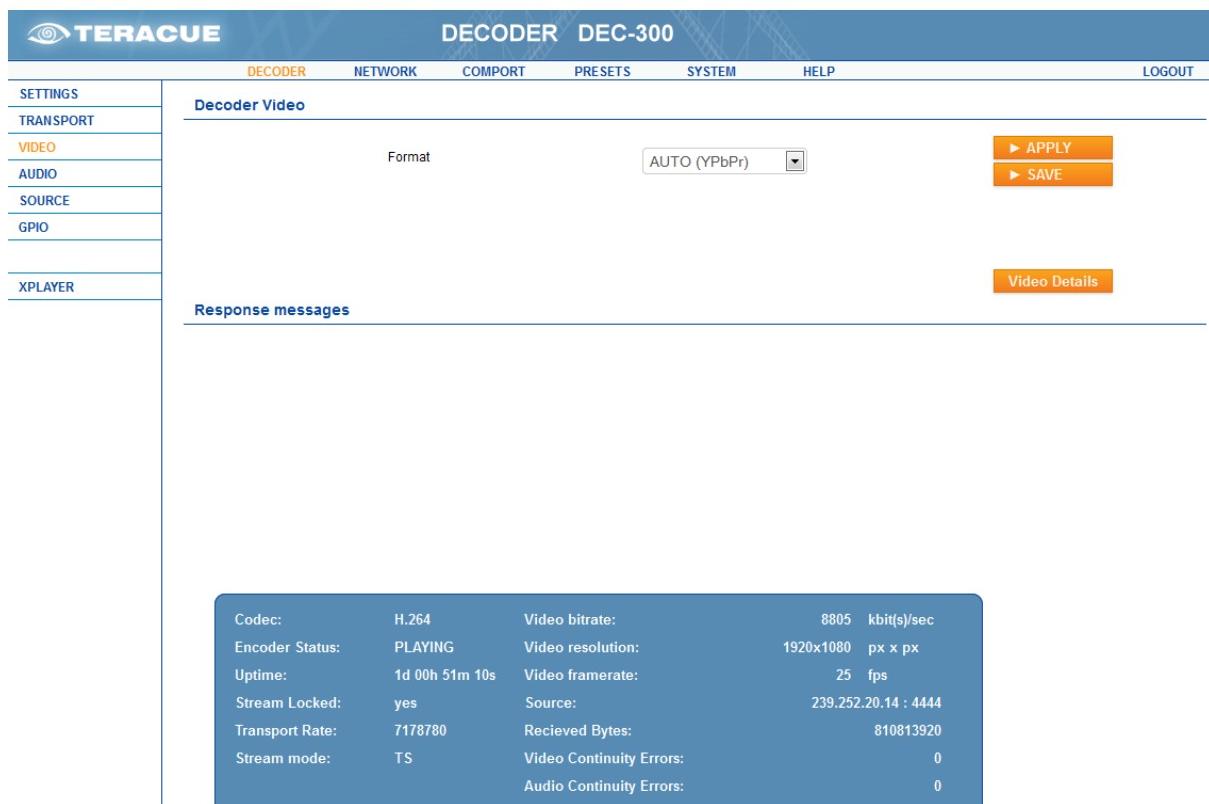


Figure 9 shows the 'Decoder / Video' page of the DEC-300™ decoder.

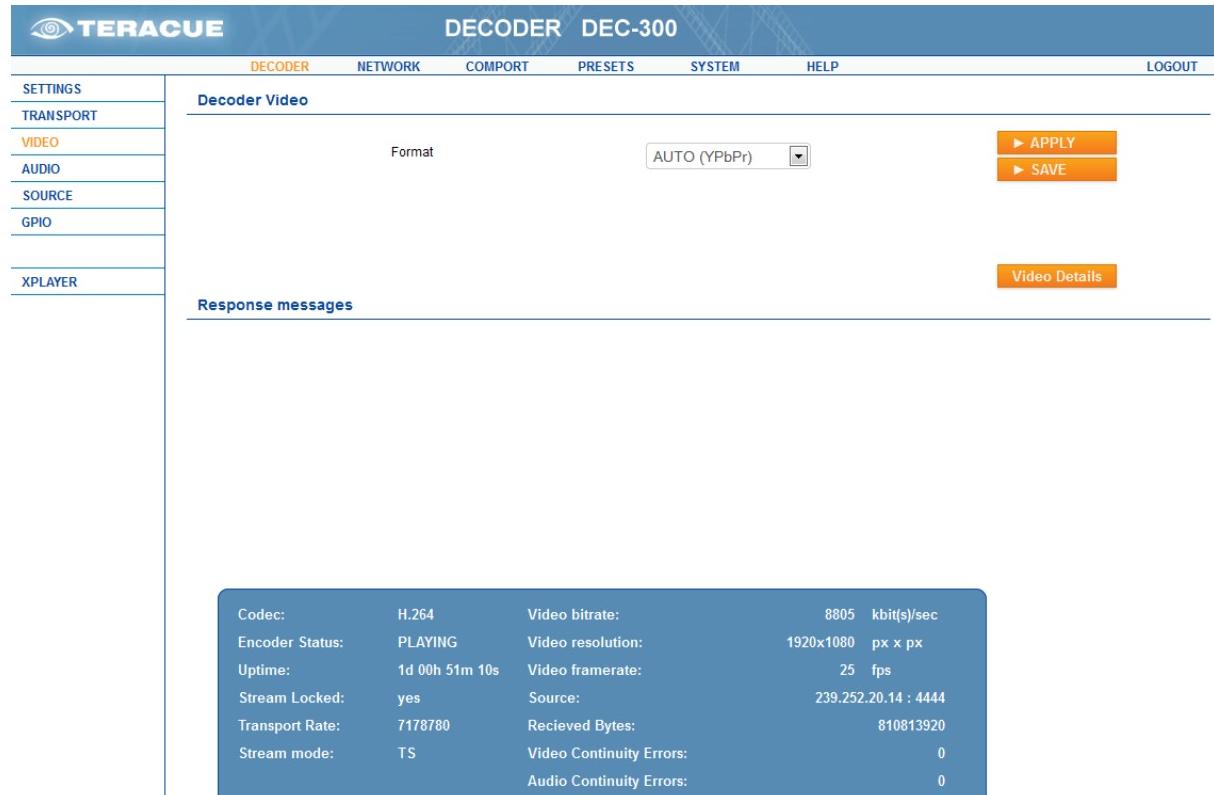


Figure 9: 'Decoder / Video' page of the DEC-300™ decoder

Table 8 describes the 'Decoder / Video' page of the DEC-300™.

Settings:	Description:
-----------	--------------

Format:	Specifies the SD/HD format and colour encoding system of the received video. You can choose between: <ul style="list-style-type: none">▪ AUTO (YPbPr)▪ 1080i60▪ 1080i50▪ 720p60▪ 720p50▪ 576i50▪ 480i60▪ AUTO (CVBS)▪ PAL▪ NTSC <p>!. Changes in this field require a reboot.</p>
---------	---

Table 8: Description of the 'DECODER/VIDEO' webpage of the DEC-300™

3.4.4 Menu: Decoder / Audio

The screenshot shows the 'Decoder / Audio' configuration page. On the left is a sidebar with links for SETTINGS, TRANSPORT, VIDEO, AUDIO (which is highlighted in orange), SOURCE, GPIO, and XPLAYER. The main area has tabs for DECODER, NETWORK, COMPORT, PRESETS, SYSTEM, and HELP, with 'LOGOUT' at the top right. Under the 'Decoder Audio' tab, there are fields for Input (set to LINE), LineIn Gain (dB) (set to 3.0), Input Mute (unchecked), Output Gain (dB) (set to 0.0), Output Mute (unchecked), Talkback IP (set to 0.0.0.0), Talkback Port (set to 9177), Talkback Rate (Hz) (set to 48000), and Talkback Stereo (unchecked). Buttons for '▶ APPLY' and '▶ SAVE' are on the right, along with a 'Audio Details' link. A note at the bottom says 'Note: Enter '0.0.0.0' in Talkback IP to disable talkback.' Below this is a 'Response messages' section with a table:

Codec:	H.264	Video bitrate:	8414 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 51m 37s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	8679020	Received Bytes:	145240340
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 10 shows the 'Decoder / Audio' page of the DEC-300™ decoder and Table 9 describes it.

This screenshot is identical to Figure 10, showing the 'Decoder / Audio' configuration page of the DEC-300™ decoder. It includes the sidebar, tabs, and response message table. The configuration values are the same as in Figure 10.

Figure 10: 'Decoder / Audio' page of the DEC-300™ decoder

Settings:	Description:
Input:	Specifies the audio input for the talkback function. You can choose between microphone (MIC) input and line (LINE) input. For more information about the talkback feature, see chapter 4.2.
Input Mute:	Enables / Disables muting the audio input.
LineIn Gain:	Specifies the line level gain for the talkback function. For more information about the talkback feature, please see chapter 4.2.
MicIn Gain [-12dB...59.5dB]:	Specifies the microphone level gain for the talkback function. For more information about the talkback feature, see chapter 4.2.

Output Gain (dB):	Specifies the line level gain for the audio output.
Output Mute:	Enables / Disables muting the audio output.
Talkback IP:	Specifies the IP-address of the encoder with which the DEC-300™ should start the talkback session. For example: A DEC-300™ should start a talkback session with an ENC-300™. The encoder has the IP-address 172.16.20.100. So you must enter in the 'Talkback IP' field of the DEC-300™ the IP-address of the encoder, in this case 172.16.20.100. If you want to turn off the talkback function, please enter the value '0.0.0.0' in this field and click the '>APPLY' button. For more information about the talkback feature, please see chapter 4.2.
Talkback Port (1-65535):	Specifies the port number of the talkback channel. For a talkback session the encoder and the decoder must have the same talkback port number. At the ENC-100™ the talkback port is 9177 and cannot be changed there. For more information about the talkback feature, please see chapter 4.2.
Talkback Rate (Hz):	Specifies the talkback sample rate. For a talkback session the encoder and decoder must have the same sample rate. For more information about the talkback feature, please see chapter 4.2.
Talkback Stereo:	Enables / Disables the stereo option of the talkback function.

Table 9: Description of the 'DECODER/AUDIO' webpage of the DEC-300™

3.4.5 Menu: Decoder / Source

DEC-300™ is capable to receive a stream either as a unicast stream or a multicast stream. According to the entered source IP-address, the decoder will automatically recognize whether it concerns about a unicast or multicast stream.

Figure 11 shows the 'Decoder / Source' page of the DEC-300™ decoder.

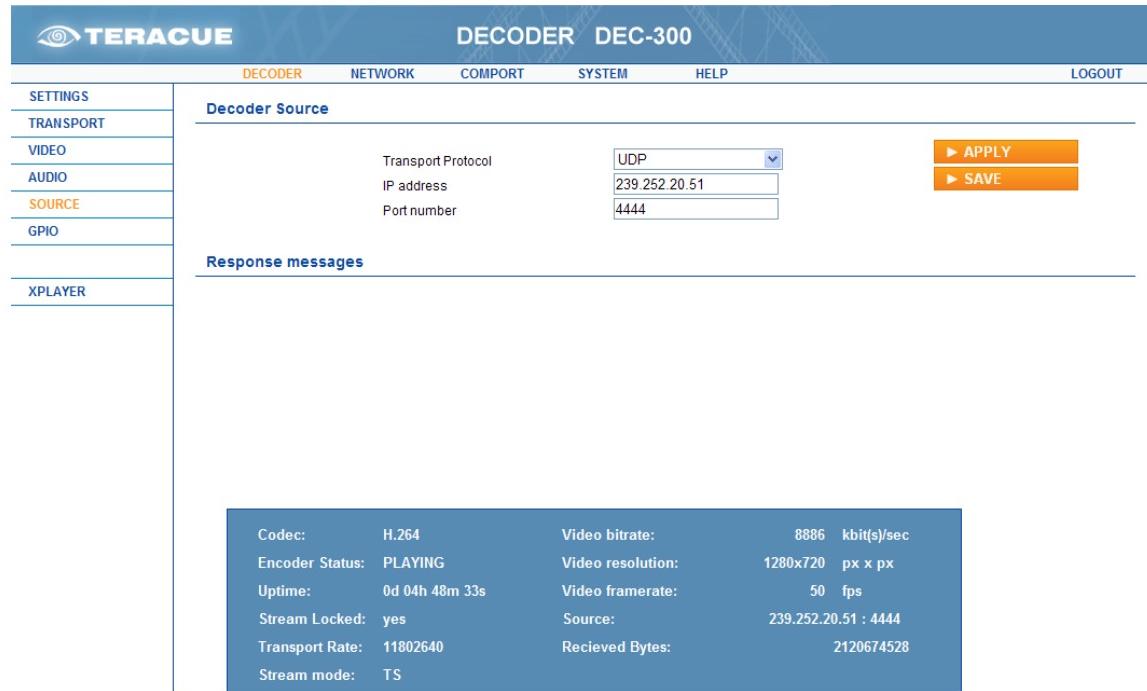
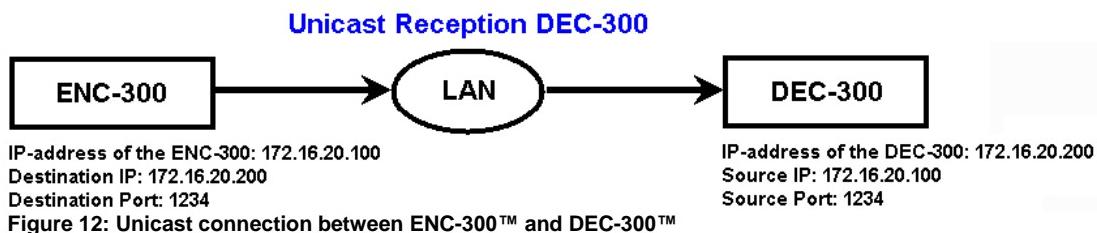


Figure 11: 'Decoder / Source' page of the DEC-300™ decoder

Table 10 describes the 'Decoder / Source' page of the DEC-300™.

Settings:	Description:
Transport Protocol:	Specifies the transport protocol. You can choose between the connectionless protocol UDP and the connection-oriented protocol TCP. If you use TCP, your source must also support the TCP protocol. Furthermore, no multicast is supported when using TCP. If you choose 'TCP/SERVER', your source must be the client. If you choose 'TCP/CLIENT', your source must be the server. For more information, please see chapter 4.3 on page 47. !.. If network errors occur in your network, we recommend using TCP protocol.
IP address:	Specifies the stream which should the DEC-300™ receive. <u>If you want to receive a multicast stream:</u> Please enter in the 'IP address' field your desired multicast IP-address, e. g. 239.252.20.100. <u>If you want to receive a unicast stream:</u> Please enter in the 'IP address' field the IP-address of the source, e. g. the IP-address of the ENC-300™, see Figure 12. Or type in '0.0.0.0'
Port number:	Specifies the port number of the stream which should DEC-300™ receive. Enter here the port number of your desired stream.

Table 10: Description of the 'DECODER/SOURCE' webpage of the DEC-300™



3.4.6 Menu: Decoder / GPIO

The General Purpose Input/Output (GPIO) supports a GPI function for the pass-through mode to control devices which are connected with another DEC-300™ decoder or ENC-300™ encoder. Furthermore it supports a GPO function for the manual mode to send a signal to a device which is directly connected to the decoder via the GPIO D-Sub connector of the breakout cable 'P'. This allows users to connect a special device, e.g. sensor to the GPIO Port and send from the decoder a signal to control the special device.

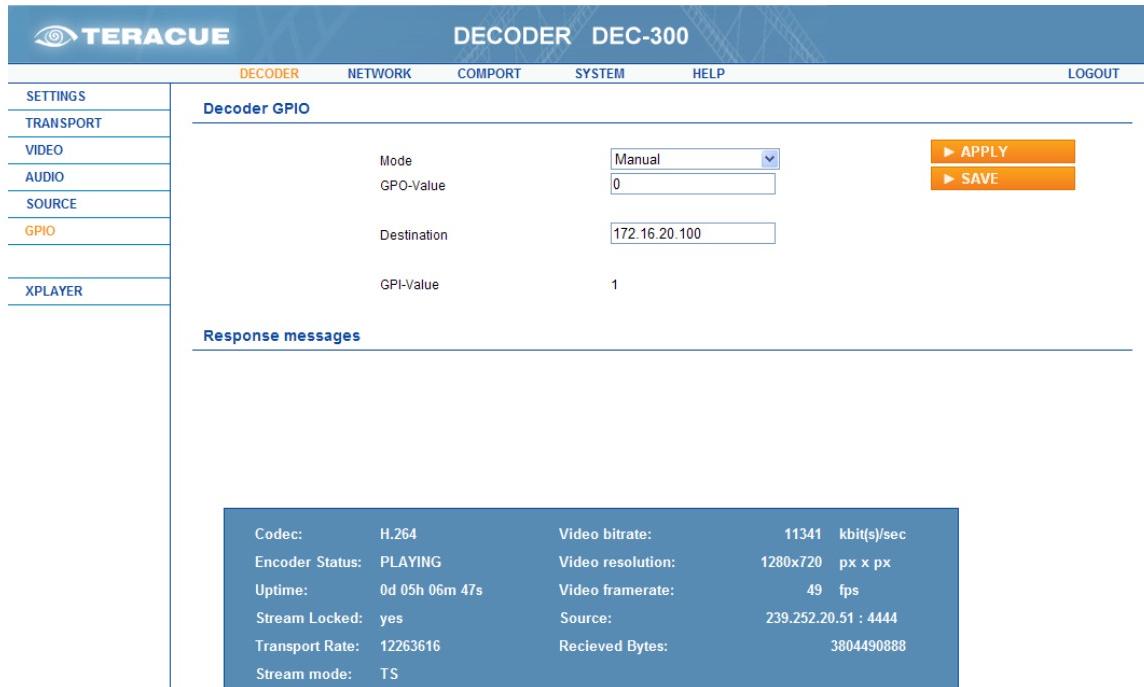


Figure 13: 'Decoder / GPIO' page of the DEC-300™ decoder

Settings:	Description:															
Mode:	Specifies the GPIO mode. ' Manual ' switches the local GPO value to the level high (=1) or low (=0). The high or low level must be entered in the 'GPO-Value' field. ' Passthrough/A ' and ' Passthrough/B ' forward the high (=1) or low (=0) level via UDP to another encoder or decoder at which a device is connected. Therefor the IP-address of the destination encoder/decoder must be entered in the 'Destination' field. The difference between 'Passthrough/A' and 'Passthrough/B' is that the GPO value of 'Passthrough/B' is inverted. 'Passthrough/A' and 'Passthrough/B' has the following states: <table border="1"> <thead> <tr> <th>Passthrough Parameter:</th> <th>DEC-300 GPI:</th> <th>ENC-300 GPO:</th> </tr> </thead> <tbody> <tr> <td>Passthrough/A</td> <td>1</td> <td>1</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td>Passthrough/B</td> <td>1</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> </tr> </tbody> </table>	Passthrough Parameter:	DEC-300 GPI:	ENC-300 GPO:	Passthrough/A	1	1		0	0	Passthrough/B	1	0		0	1
Passthrough Parameter:	DEC-300 GPI:	ENC-300 GPO:														
Passthrough/A	1	1														
	0	0														
Passthrough/B	1	0														
	0	1														
GPO-Value:	Specifies the GPO high or low level. '0' indicates the low level and '1' indicates the high level. This field is only in use, when the mode is set to 'Manual'.															
Destination:	Specifies the IP-address of the destination encoder/decoder to which the connection shall be created. This field is only in use, when the mode is set to 'Passthrough/A' or 'Passthrough/B'.															
GPI-Value:	Shows the high/low level which the decoder gets. Read-only field.															

Table 11: Description of the 'DECODER/GPIO' webpage of the DEC-300™

The GPIO D-Sub Connector of the breakout cable 'P' has the following pin assignment.

Pin:	GPIO Assignment:
1	NC
2	GPO-B (Relay B)
3	GPI-C (Input)
4	3.3V
5	GND
6	NC
7	GPO-A (Relay A)
8	GPI-A (Input)
9	NC

Table 12: Assignment of the GPIO Sub-D Connector of the Breakout Cable 'P'

- .!. The 3.3V output has no series resistor inside.
- .!. The non-operating state of GPI is 1. To change the GPI value to 0, you must set GPI-C to GND and feed the GPI-A with 3.3V.
- .!. The non-operating state of GPO is 0 that means the relay has a normally-open contact.
- .!. The GPI has an optoelectronic coupler and GPO has a relay.
- .!. For an error-free GPIO operation in passthrough mode, both, the GPI source and the GPO destination must be configured correctly. That means, the source and the destination must be set to the identical passthrough mode, the correct IP-address of the GPO destination must be entered in the source and the correct IP-address of the GPI source must be entered in the destination. Furthermore, as long as the GPIO mode is set to 'Manual' the GPI is blocked.

3.4.7 Menu: Decoder / XPlayer

The menu 'XPlayer' starts the 'Standalone XPlayer', if an 'XPlayer' is installed on the client PC. The XPlayer-Link was added to check whether the entered source is available in the network. You can start the 'XPlayer' by clicking the XPlayer-Link inside the 'Decoder' menu.

Afterwards the 'XPlayer' automatically displays the input stream, which you have entered in the 'Decoder / Source' page of the DEC-300™ decoder, provided that the source IP-address is a multicast stream. The source IP-address must be a multicast address.



Figure 14: 'Decoder / XPlayer' page with opened XPlayer

If the XPlayer is not installed on the client PC, the XPlayer-Link will have no function.

.!. Requirement for this feature: The XPlayer must be installed.

3.4.8 Menu: Network / Settings

Figure 15 shows the 'Network / Settings' page of the DEC-300™ decoder. Here you are able to set the decoder's own IP-address, subnet mask, gateway address and define the decoder's host name.

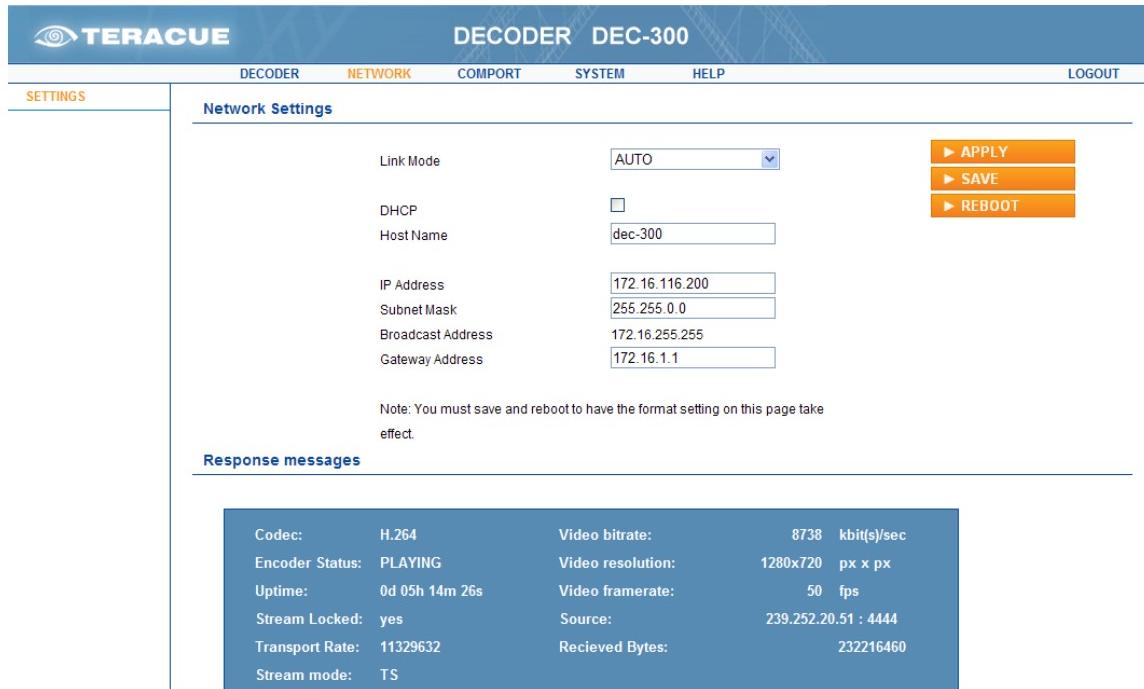


Figure 15: 'Network / Settings' page of the DEC-300™ decoder

Table 13 describes the 'Network / Settings' page of the DEC-300™.

Settings:	Description:
Link Mode:	Specifies the network port characteristics of the DEC-300™. This option has been added especially to address specialized network and/or administration requirements. !.. In most cases it is sufficient (and recommended) to leave this setting on 'AUTO', so the DEC-300™ and the connected switch can deal out the preferred connection on their own.
DHCP:	Enables / Disables DHCP. Only use this option if you are familiar with DHCP and your network supports DHCP.
Host Name:	Specifies the hostname of the DEC-300™. Please enter your desired hostname of the DEC-300™.
IP Address:	Specifies the IP-address of the DEC-300™. The IP-address is an identifier for your DEC in the TCP/IP network. Networks use the TCP/IP protocol route messages based on the IP-address of the destination. The format of an IP-address is a 32-bit numeric address written as four numbers separated by periods. Each number can range from 0 to 255. E.g.: 172.16.20.200
Subnet Mask:	Specifies the subnet mask of the DEC-300™. A subnet mask is a 32-bitmask used to divide an IP-address into subnet and specify the networks available hosts. E.g.: 255.255.0.0 is the net mask for a class-B IP-address like 172.16.20.200.
Broadcast Address:	Displays the broadcast IP-address. (Read only field)
Gateway Address:	Specifies the IP-address of your gateway. The gateway is commonly the address of the network device such as a network router.

Table 13: Description of the 'NETWORK/SETTINGS' webpage of the DEC-300™

- .!. When the IP-address has been changed, the decoder needs to be reset (reboot), in order for the new IP-address to take effect. When changing the IP-address please type in the new IP-address, subnet mask, gateway-address and host name. Then hit the 'SAVE' button and then the 'REBOOT' button.

3.4.9 Menu: Comport / Settings

The ‘comport / settings’ webpage defines the parameters for the DEC’s integrated comport/serial port. DEC-300™ decoders are always comport clients and ENC-300™ encoders are always comport servers.



Figure 16: 'Comport / Settings' page of the DEC-300™ decoder

Settings:	Description:
Mode:	Specifies the comport mode. You can choose between ‘Console’ and ‘Passthrough’. ‘Console’ enables access and control of the DEC-300™ configuration via the com-cable (null modem cable). Use this cable to set the DEC-300™ configuration when you do not want to use web access. ‘Passthrough’ enables setting comport to a serial mode. RS-232 devices can be connected and controlled via comport. This is useful, e. g. when cameras or other non-network devices need to be remotely controlled. RS-232 commands can be tunnelled and sent via TCP/IP to comport client, where they will be returned into native RS-232 commands. When a connection is opened from the client (e.g. decoder) to the IP-address of an encoder (e.g. ENC-300™) at port 7777, the serial function is activated and any data (string) is passed straight to the connected RS-232 device. Once the connection is established, this also works the other way for information coming back from the RS-232 device.
Destination:	Specifies the destination IP-address at which tunnelled RS-232 commands shall be sent. If ‘Passthrough’ is chosen as comport mode, here must be entered the destination IP-address.
Bitrate:	Specifies the used bitrate in bits per second.
Databits:	Specifies the databits. You can choose between ‘7’ and ‘8’.
Parity:	Specifies the parity. You can choose between ‘none’, ‘odd’ and ‘even’.
Stopbits:	Specifies the value of used stopbits. You can choose between ‘1’ and ‘2’.

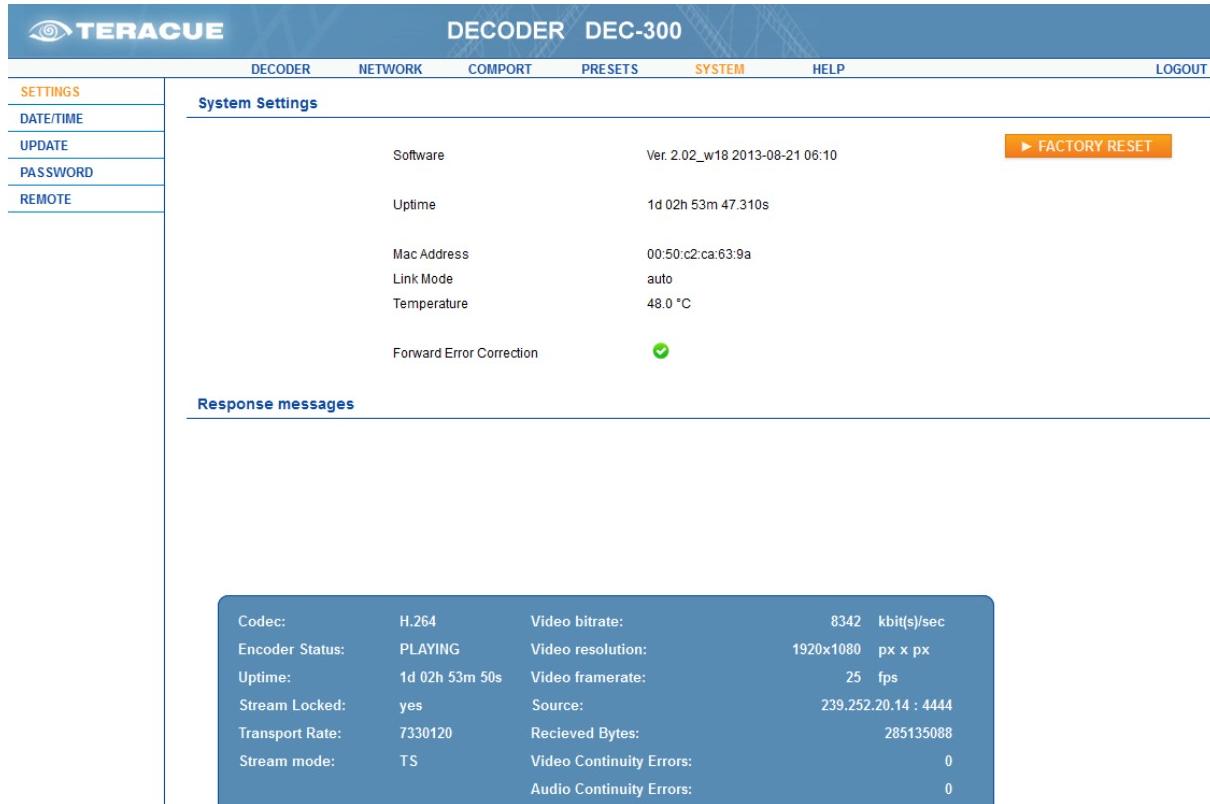
Table 14: Description of the 'COMPORT/SETTINGS' webpage of the DEC-300™

3.4.10 Menu: System / Settings

The menu 'System/Settings' displays information about the firmware version that is installed on your DEC-300™.

Among other things you will find information about the system uptime, MAC-address and the Link Mode.

See



Codec:	H.264	Video bitrate:	8342 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 53m 50s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	7330120	Received Bytes:	285135088
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 17.



The screenshot shows the 'System / Settings' page of the DEC-300™ decoder. The top navigation bar includes links for DECODER, NETWORK, COMPORT, PRESETS, SYSTEM (which is highlighted in yellow), and HELP, along with a LOGOUT link. On the left, a vertical menu lists SETTINGS, DATE/TIME, UPDATE, PASSWORD, and REMOTE. The main content area is divided into sections: 'System Settings' (showing Software version 2.02_w18 2013-08-21 06:10, Uptime 1d 02h 53m 47.310s, Mac Address 00:50:c2:ca:63:9a, Link Mode auto, Temperature 48.0 °C, and Forward Error Correction enabled with a green checkmark), 'Response messages' (empty), and a summary table.

Codec:	H.264	Video bitrate:	8342 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 53m 50s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	7330120	Received Bytes:	285135088
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 17: 'System / Settings' page of the DEC-300™ decoder

3.4.11 Menu: System / Date/Time

You can set the time and date for the decoder in the menu 'System/Date/Time'. See Figure 18.



Figure 18: 'System / Date/Time' page of the DEC-300™ decoder

Settings:	Description:
Device Date/Time:	Specifies the current date / time which is set at the DEC-300.
Client Date/Time:	Specifies the current date / time of your client.
Set Date/Time:	Specifies the current date and time. Please enter in the left field the date in the following syntax MM/DD/YYYY. Afterwards enter the time. Therefor enter in the middle field the hours and in the right field the minutes.

Table 15: Description of the 'SYSTEM/DATE/TIME' webpage of the DEC-300™

3.4.12 Menu: System / Update (Upgrading firmware version)

Teracue's goal is customer satisfaction and constant product improvement. Please check regularly to see if the most recent firmware version is installed on your DEC-300™. Please visit the IPTV Support area on: www.teracue.com.

Firmware versions can be downloaded from the Teracue support website listed above. Firmware versions have the suffix *.cpio.

Download the correct firmware version that you wish, to update your decoders with, and save it locally on your computer.

Open the configuration webpage of the DEC-300™ and select the submenu 'UPDATE' within the menu 'SYSTEM', see Figure 19.

Click on the 'Browse' button to locate the cpio-file on your local hard drive. Hit 'OK' and the path to the file will be listed in the box in the middle of the screen.

To start the firmware update procedure simply click on the '► UPDATE' button.

After you have started the firmware update a hint website appears, that you shall not disconnect the decoder from the network or power down the decoder. During the firmware update the decoding process stops. Please wait till your web browser shows login screen from your decoder. If the login screen appears, the update is finished and you can login to your decoder. It is no rebooting necessary. The decoding process starts automatically after the firmware update is finished.



Figure 19: 'System / Update' page of the DEC-300™ decoder

- .!. The update will not change your current settings.
- .!. During update time do not disconnect the decoder from the network or the power.
Doing so will harm your decoder!
- .!. Trying to connect to the decoder or navigating on the configuration webpages during the updating process can also harm your decoder.

3.4.13 Menu: System / Password

Figure 20 shows the 'System / Password' page of the DEC-300™ decoder.

If you do need to change the password due to security issues, then simply click on the submenu 'PASSWORD' and enter the new password twice in the provided boxes. Then hit the 'APPLY' button.



Figure 20: 'System / Password' page of the DEC-300™ decoder

- .!. Unless your decoder is used in very critical scenarios, we recommend to leave the password set to its default value ('admin', 'admin').

3.4.14 Menu: System / Remote

Figure 21 shows the 'System / Remote' page of the DEC-300™ decoder.

Enables / Disables the port 2323 for remote controlling. If you want use the remote control function, you must enable the 'Remote Configuration' field. Then hit the 'APPLY' and 'SAVE' button. For more information about remote control, please see chapter 4.1 on page 38.



Figure 21: 'System / Remote' page of the DEC-300™ decoder

3.5 Help

Clicking on the ‘HELP’ button will open the Teracue website where you can get to the ‘Support’ link. Here you can get the current version of the DEC-300™ user guide.

- .!. **This will only work if the decoder is situated in a network in which internet access is provided. Otherwise ‘page not found’ may be displayed.**

3.6 Logout

After having made adjustments to the decoder, please be sure to logout, see

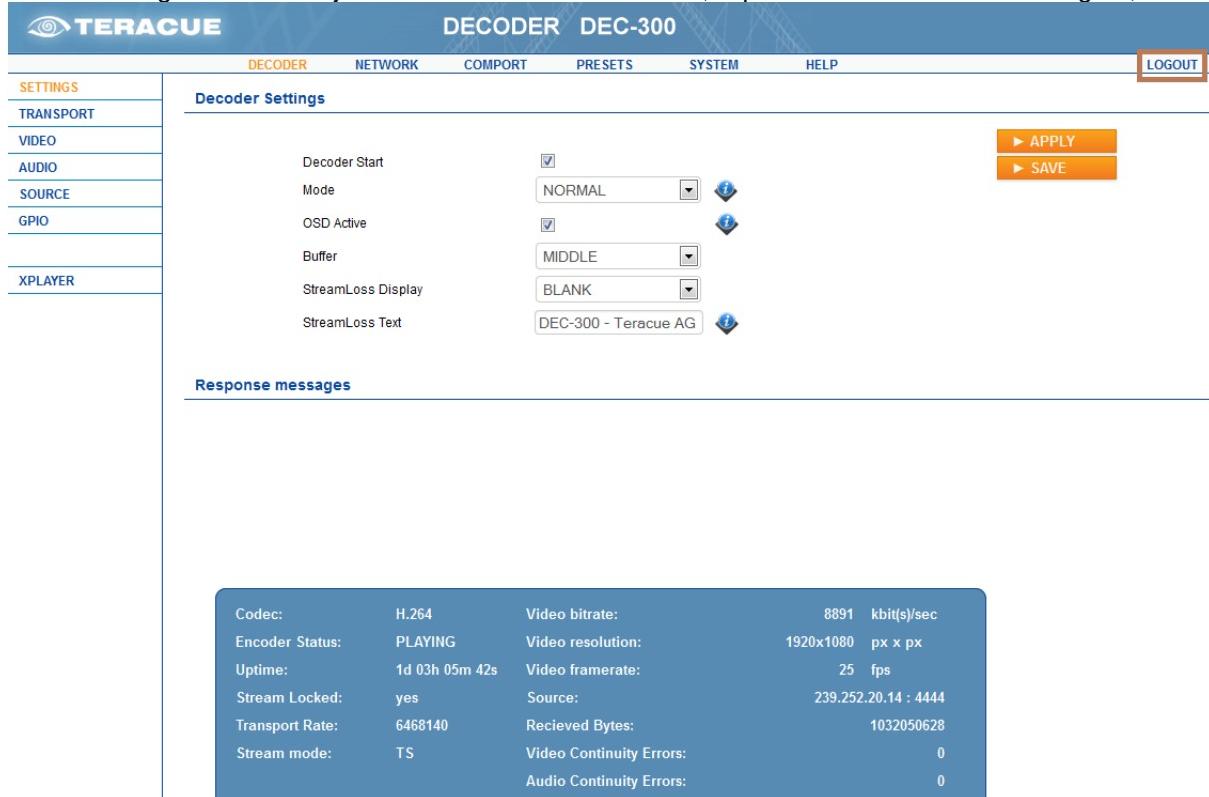


Figure 22.

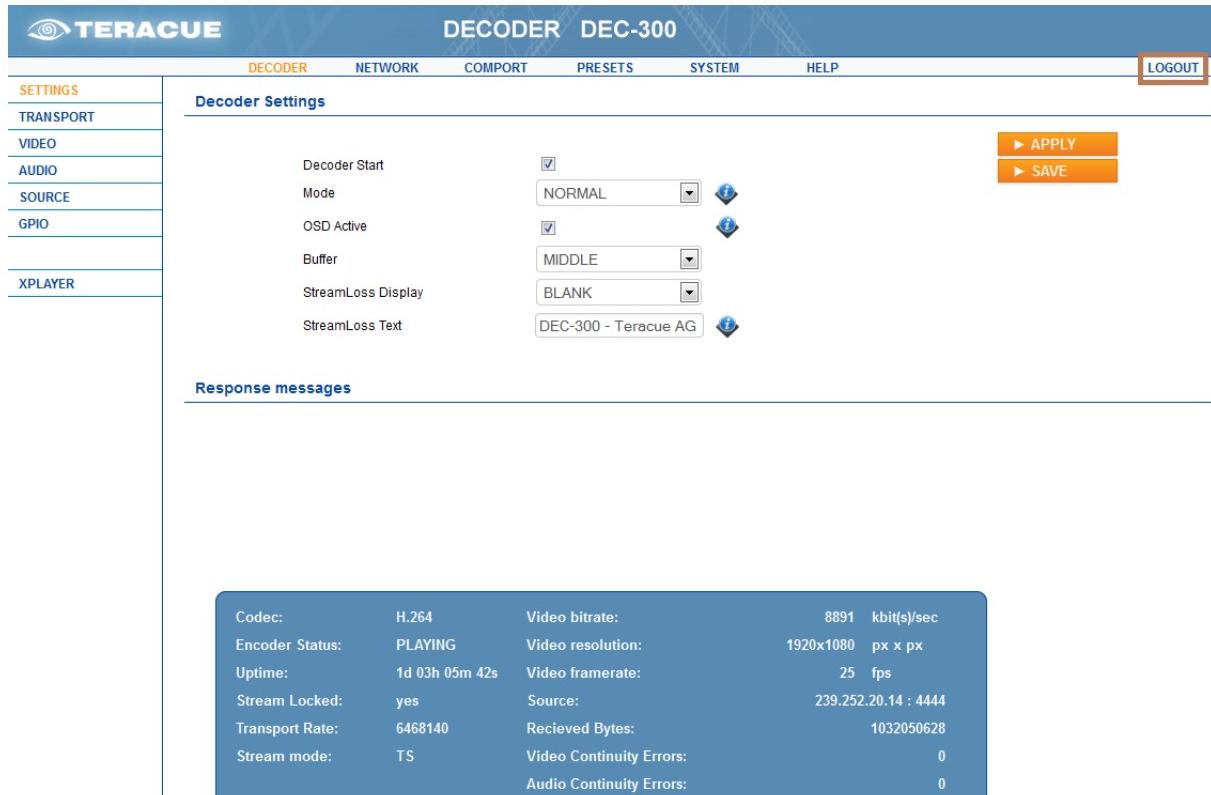


Figure 22: Logout from the DEC-300™

!.. Logging out prevents misuse and unauthorized access to the DEC-300™.

4. Extended Function

4.1 Remote Control

This chapter describes the remote control of the DEC-300™ for media controls like Crestron or AMX. To control the DEC-300™, the telnet protocol is used at the port number 2323. Furthermore here is no login necessary.

To test the remote control under windows you can open the command prompt tool. A practical way to open a command window within Windows Explorer is to write C:\Windows\system32\cmd.exe. Another way to open a new command prompt is by choosing the ‘Start’ menu and selecting ‘Run’. Then write ‘cmd’ in the text field and press the ‘OK’ button. See Figure 23.



Figure 23: Command to open the command prompt

In both cases the following window opens, see Figure 24.

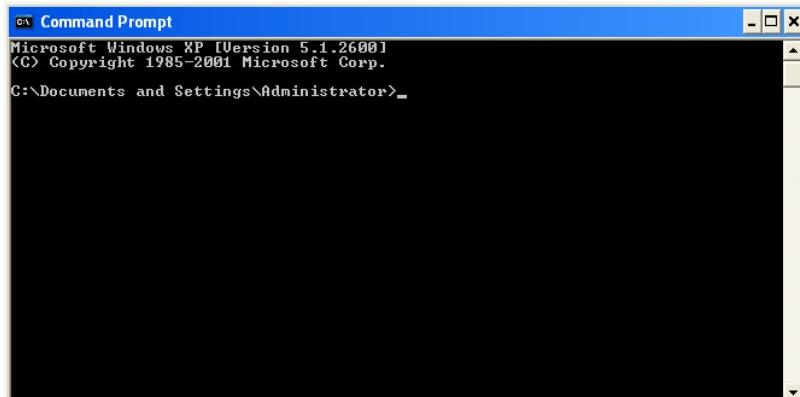


Figure 24: 'Command Prompt' window to test the remote control of the DEC-300™

For starting a telnet session type: telnet <ip-address> <2323>, e.g. 'telnet 172.16.20.200 2323', and press the Enter button. See Figure 25.

The value '2323' specifies the used TCP/IP port number for the telnet session of the remote control test. The IP-address should correspond to the DEC's IP-address.

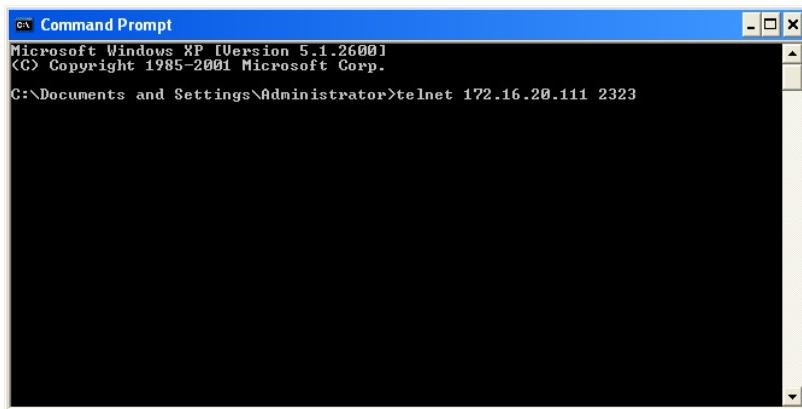


Figure 25: Starting a telnet session for the remote control test

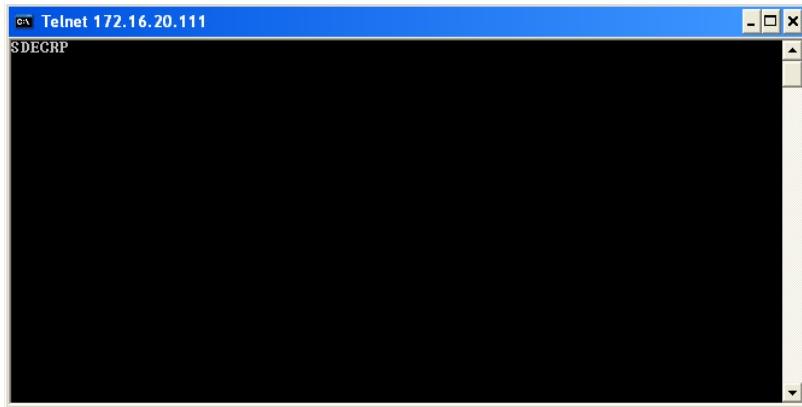


Figure 26: Session to test the remote control of the DEC-300™

After you have start the session, you got the display, see Figure 26: SDECRP

The command 'help' will display a list of all available options.

The 'ls' command allows you to see the available directories and options in the current directory. To change the current directory, write 'cd directory_name', e.g. 'cd status'. To go one directory layer upstairs, enter the command 'cd ..'. If you enter the command 'exit', the telnet session will close.

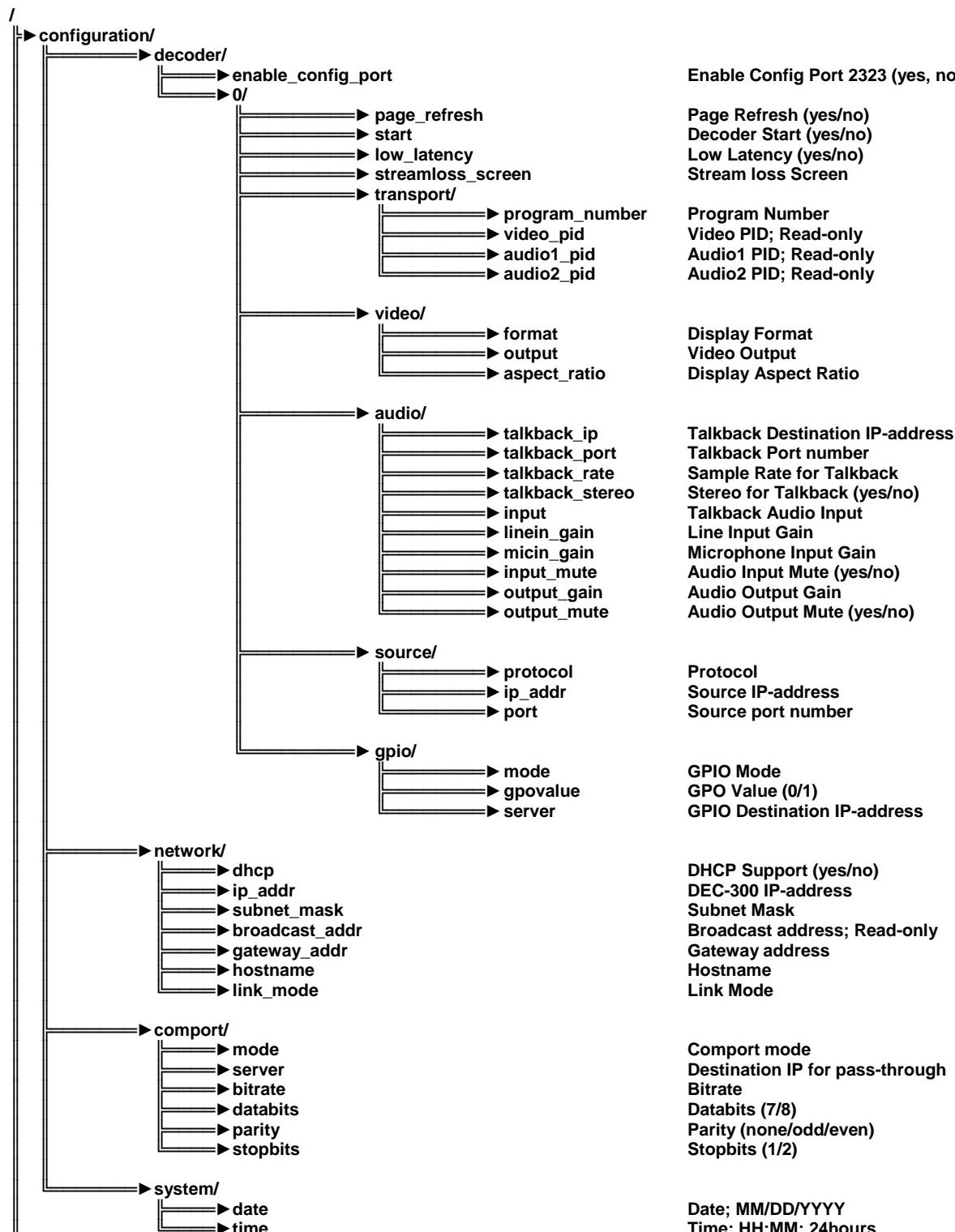
If you want to enter the value of an option you must use the 'put' command followed by the correct values. Afterwards use the 'apply' and 'save' commands to apply and/or save your changes.

.!. Example:

E.g. for changing the source IP-address, you need to type the following:

- put /configuration/decoder/0/source/ip_addr 239.252.20.100
- apply /configuration/decoder/0/source/ip_addr
- save

.!. Figure 27 provides an overview over the telnet navigational and directory structure to test the remote control. This overview is useful to find the correct configuration settings when navigating in telnet mode. For instructions and descriptions on the individual settings, please see the corresponding chapters for web based configuration.



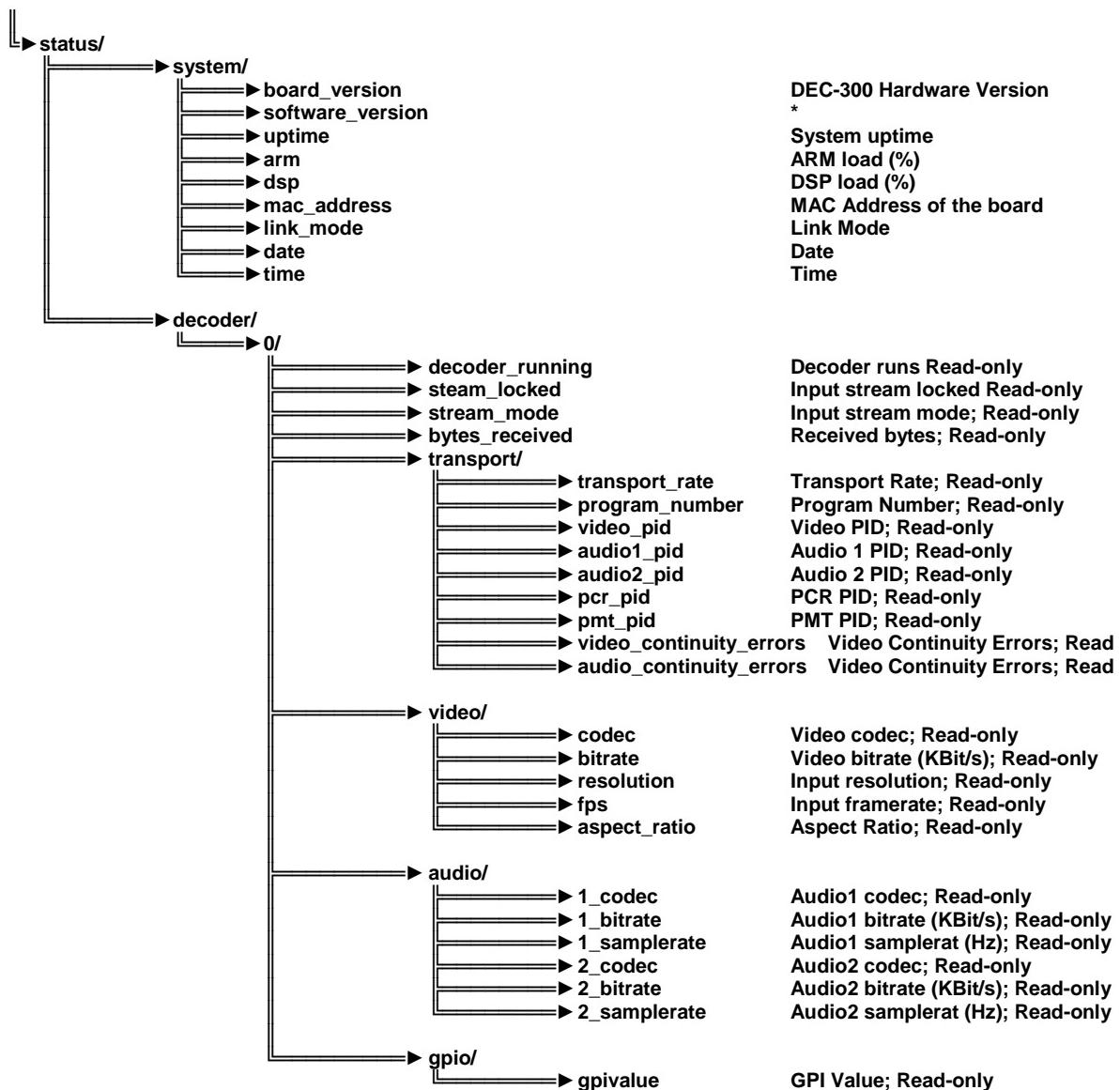


Figure 27: Telnet directory structure for Remote Control testing

* = is not supported at the moment

4.2 Audio Talkback

The audio input on the DEC-300™ operates as an audio encoder. It enables operating the DEC-300™ in Full Duplex Audio. The DEC-300™ in connection with the ENC-100™/ENC-200™ or ENC-300™ can therefore be used for audio conferencing environments, where viewers of the encoded live streams are to be able to ask questions and communicate with people on the encoding side. The default talkback port number of the DEC-300™ is 9177.

For Example:

An encoder can be set up to encode video and audio from a camera that is installed at an entrance (security application). The person who wants to enter speaks into a microphone to state his/her name, etc. The microphone is connected to the audio input of the encoder. By using the decoder's audio input a receptionist/security officer is able to talk back to the person, e.g. arguing why access is denied or that the person should hold its ID into the camera. This represents regular two-way communication (Full Duplex Mode).

Another Example:

Students from classrooms or large auditoriums are communicating with doctors or surgeons inside of operation rooms or other sealed environments. With the DEC-300's talkback option students or monitoring staff are able to ask on the spot questions and communicate and learn in real-time.

4.2.1 Talkback Session between DEC-300™ and ENC-300™

To use the talkback function on the DEC-300™ in connection with the ENC-300™, please be sure that your encoder has the firmware version 2.03_w36 or higher, because this firmware is necessary. If your ENC-300™ does not have the firmware version 2.03_w36 or higher, please contact support@teracue.com.

Furthermore the ENC-300-HDSDI supports the talkback function in the portable chassis and in the FR-610 chassis. The ENC-300-DVI supports the talkback function only in the FR-610 chassis.

In order to talkback from the DEC-300™ to the ENC-300™, please be sure that you have a microphone or another audio signal connected to the 'Audio In' input of your DEC-300™. Take also care that loudspeakers are connected in the 'Audio Out' output of the ENC-300™ on which you want talkback. See Figure 28. Figure 29 shows the talkback connection between DEC-300™ and ENC-300™ in Full Duplex Mode.

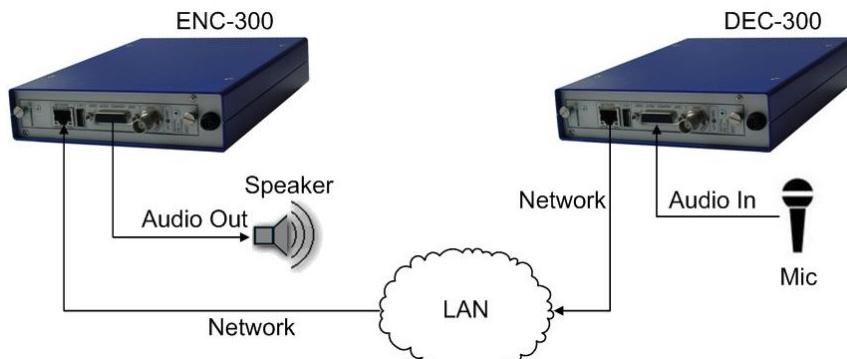
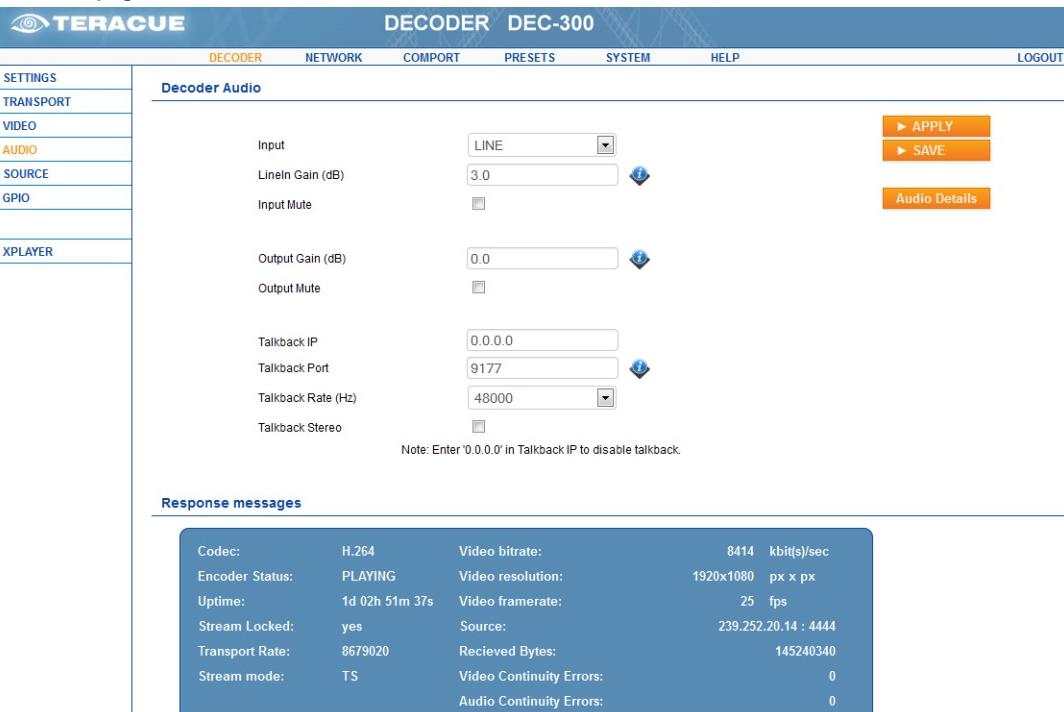


Figure 28: Talkback connection between DEC-300™ and ENC-300™

For a talkback session you must configure the DEC-300™ decoder and the ENC-300™ encoder.

To start the talkback session you must configure the DEC-300™ webpage. Please open the DEC-300™ webpage, 300™ webpage, select in the main menu 'DECODER' and click in the submenu 'AUDIO'. See



Codec:	H.264	Video bitrate:	8414 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 51m 37s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	8679020	Received Bytes:	145240340
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 10 on page 22.

Enter in the 'Talkback IP' field the IP-address of the encoder with which the DEC-300™ should start the talkback session. For example: A DEC-300™ should start a talkback session with an ENC-300™. The encoder has the IP-address 172.16.20.100. So you must enter in the 'Talkback IP' field of the DEC-300™ webpage the IP-address of the encoder, in this case 172.16.20.100.

Next, the talkback port number must be entered in the 'Talkback Port' field. The decoder and the encoder must always have the same talkback port number. So please enter in the 'Talkback Port' field of the DEC-300™ your desired port number for the talkback session. This talkback port number must also be set in the ENC-300™ webpage.

Now, you must select in the field 'Talkback Rate' your desired sample rate, which should be used from the decoder. The decoder and the encoder must always use the same sample rate. So, the set talkback rate must also be set in the ENC-300™ webpage.

Furthermore, please select in the drop-down-field 'Input' the corresponding audio input for the talkback function. If you supply the DEC-300™ with the audio signal from a microphone, you must select in the drop-down-field 'Input' the parameter 'MIC'. If you supply the DEC-300™ with a line level signal (e.g.: the audio signal from a DVD-Player), you must select in the drop-down-field 'Input' the parameter 'LINE'.

You can also set the gain in the fields 'LineIn Gain' and 'MicIn Gain' for the corresponding audio input, which you have set in the 'Input' drop-down-field.

The DEC-300™ is totally configured for a talkback session now. As next you must configure the ENC-300™ webpage. Therefor please open the ENC-300™ webpage, select in the main menu 'ENCODER' and click in the submenu 'AUDIO'. Here you must enter the talkback port number in the 'Talkback Port' field. The port number which you enter must be the same port number which you have entered on the decoder side. Furthermore you must select in the field 'Talkback Rate' the sample rate, which you have selected on the decoder side. If you have an stereo audio signal, you can enable the 'Talkback Stereo' check-box. You can also set the output gain level in the 'Output Gain' field and you can mute the audio of the talkback session by enabling the 'Output Mute' check-box.

Now, the DEC-300™ and your desired ENC-300™ is completely configured and you can talkback to your desired ENC-300™. To stop the talkback session, please enter '0.0.0.0' in the 'Talkback IP' field of the DEC-300™.

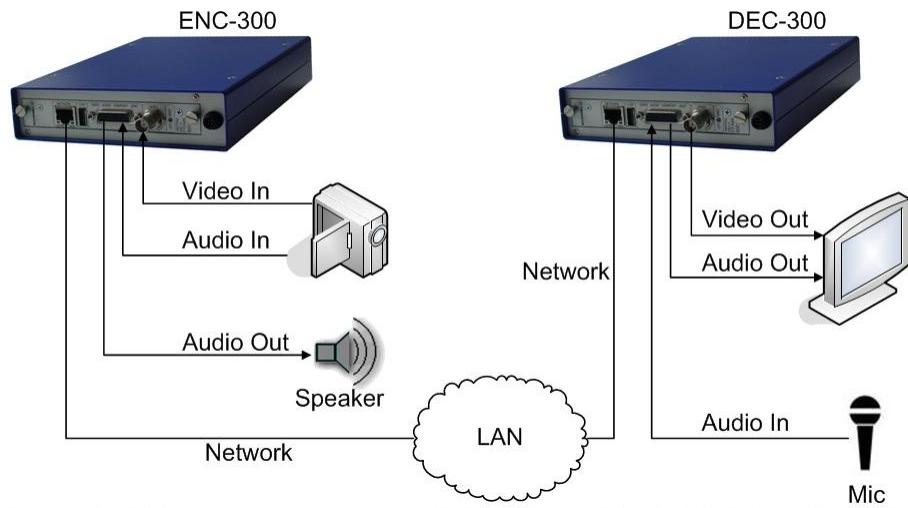


Figure 29: Talkback connection between DEC-300™ and ENC-300™ in Full Duplex Mode

4.2.2 Talkback Session between DEC-300™ and ENC-200™

To use the talkback function on the DEC-300™ in connection with the ENC-200™, please be sure that your encoder has the firmware version 0.9.20 or higher, because this firmware is necessary. If your ENC-200™ does not have the firmware version 0.9.20 or higher, please contact support@teracue.com.

In order to talkback from the DEC-300™ to the ENC-200™, please be sure that you have a microphone or another audio signal connected to the 'Audio In' input of your DEC-300™. Take also care that loudspeakers are connected in the 'Audio Out' output of the ENC-200™ on which you want talkback. See Figure 30. Figure 31 shows the talkback connection between DEC-300™ and ENC-200™ in Full Duplex Mode.

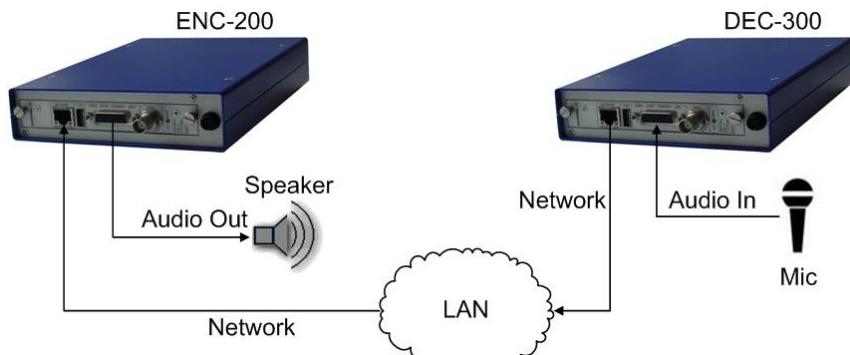
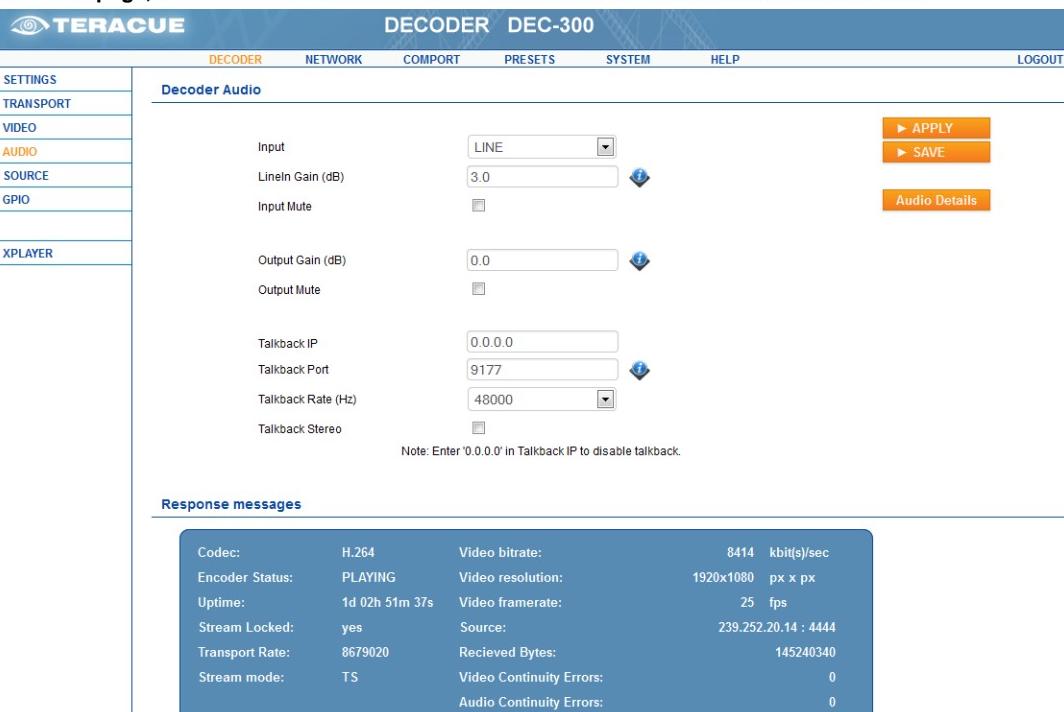


Figure 30: Talkback connection between DEC-300™ and ENC-200™

For a talkback session you must configure the DEC-300™ decoder and the ENC-200™ encoder.

To start the talkback session you must configure the DEC-300™ webpage. Please open the DEC-300™ webpage, select in the main menu 'DECODER' and click in the submenu 'AUDIO'. See



Codec:	H.264	Video bitrate:	8414 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 51m 37s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	8679020	Received Bytes:	145240340
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 10 on page 22.

Enter in the 'Talkback IP' field the IP-address of the encoder with which the DEC-300™ should start the talkback session. For example: A DEC-300™ should start a talkback session with an ENC-200™. The encoder has the IP-address 172.16.20.100. So you must enter in the 'Talkback IP' field of the DEC-300™ webpage the IP-address of the encoder, in this case 172.16.20.100.

Next, the talkback port number must be entered in the 'Talkback Port' field. The decoder and the encoder must always have the same talkback port number. So please enter in the 'Talkback Port' field of the DEC-300™ your desired port number for the talkback session. This talkback port number must also be set in the ENC-200™ webpage.

Now, you must select in the field 'Talkback Rate' your desired sample rate, which should be used from the decoder. The decoder and the encoder must always use the same sample rate. So, the set talkback rate must also be set in the ENC-200™ webpage.

Furthermore, please select in the drop-down-field 'Input' the corresponding audio input for the talkback function. If you supply the DEC-300™ with the audio signal from a microphone, you must select in the drop-down-field 'Input' the parameter 'MIC'. If you supply the DEC-300™ with a line level signal (e. g.: the audio signal from a DVD-Player), you must select in the drop-down-field 'Input' the parameter 'LINE'.

You can also set the gain in the fields 'LineIn Gain' and 'MicIn Gain' for the corresponding audio input, which you have set in the 'Input' drop-down-field.

The DEC-300™ is totally configured for a talkback session now. As next you must configure the ENC-200™ webpage. Therefor please open the ENC-200™ webpage, select in the main menu 'ENCODER' and click in the submenu 'AUDIO'. Here you must enter the talkback port number in the 'Talkback Port' field. The port number which you enter must be the same port number which you have entered on the decoder side. Furthermore you must select in the field 'Talkback Rate' the sample rate, which you have selected on the decoder side. You can also set the output gain level in the 'Output Gain' field and you can mute the audio of the talkback session by enabling the 'Output Mute' check-box.

Now, the DEC-300™ and your desired ENC-200™ is completely configured and you can talkback to your desired ENC-200™. To stop the talkback session, please enter '0.0.0.0' in the 'Talkback IP' field of the DEC-300™.

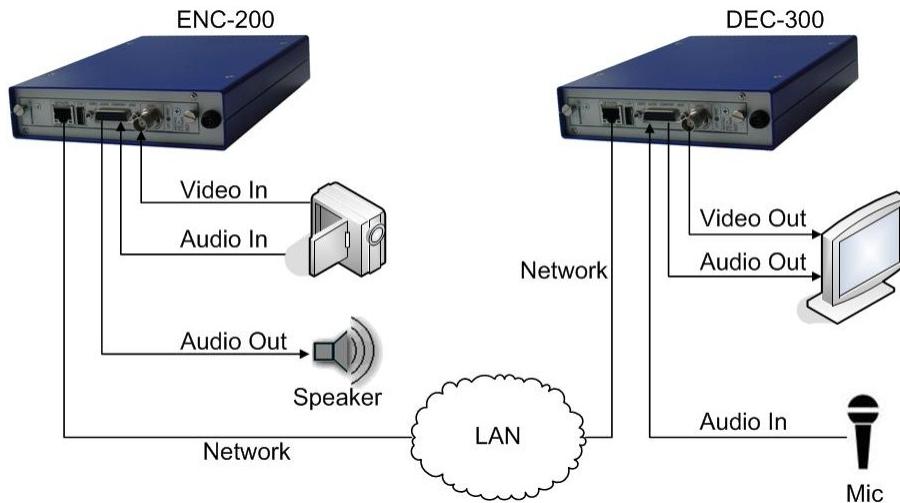


Figure 31: Talkback connection between DEC-300™ and ENC-200™ in Full Duplex Mode

4.2.3 Talkback Session between DEC-300™ and ENC-100™

To use the talkback function on the DEC-300™ in connection with the ENC-100™, please be sure that your encoder has the firmware version 3.12, because this firmware is necessary. If your ENC-100™ does not have the firmware version 3.12, please contact support@teracue.com.

In order to talkback from the DEC-300™ to the ENC-100™, please be sure that you have a microphone or another audio signal connected to the 'Audio In' input of your DEC-300™. Take also care that loudspeakers are connected in the 'Audio Out' output of the ENC-100™ on which you want talkback. See Figure 32. Figure 33 shows the talkback connection between DEC-300™ and ENC-100™ in Full Duplex Mode.

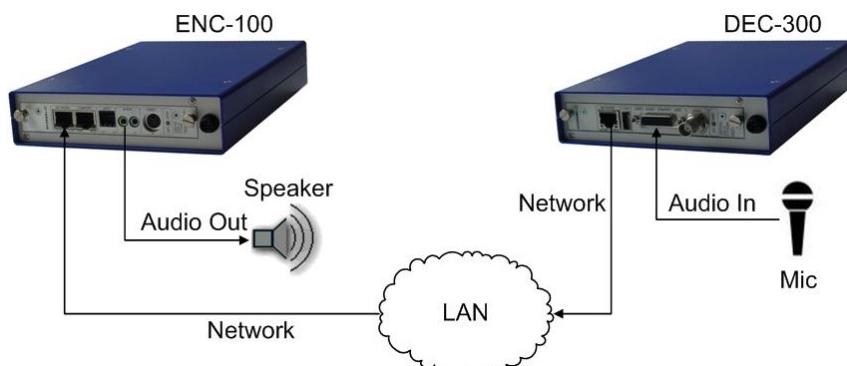


Figure 32: Talkback connection between DEC-300™ and ENC-100™

To start the talkback session you must configure the DEC-300™ webpage. Please open the DEC-300™ webpage, 300™ webpage, select in the main menu ‘DECODER’ and click in the submenu ‘AUDIO’. See



Codec:	H.264	Video bitrate:	8414 kbit(s)/sec
Encoder Status:	PLAYING	Video resolution:	1920x1080 px x px
Uptime:	1d 02h 51m 37s	Video framerate:	25 fps
Stream Locked:	yes	Source:	239.252.20.14 : 4444
Transport Rate:	8679020	Received Bytes:	145240340
Stream mode:	TS	Video Continuity Errors:	0
		Audio Continuity Errors:	0

Figure 10 on page 22.

Enter in the ‘Talkback IP’ field the IP-address of the encoder with which the DEC-300™ should start the talkback session. For example: A DEC-300™ should start a talkback session with an ENC-100™. The encoder has the IP-address 172.16.20.100. So you must enter in the ‘Talkback IP’ field of the DEC-300™ webpage the IP-address of the encoder, in this case 172.16.20.100.

Next, the talkback port number must be entered in the ‘Talkback Port’ field. The decoder and the encoder must always have the same talkback port number. For a talkback session the ENC-100™ listens always on port 9177 and this port number cannot be changed at the encoder side. So please enter in the ‘Talkback Port’ field of the DEC-300™ the port number 9177.

Now, you must select in the field ‘Talkback Rate’ your desired sample rate, which should be used from the decoder. The decoder and the encoder must always use the same sample rate. So, the set talkback rate must also be set in the ENC-100™ webpage. At the encoder side it can be only chosen between 22.05 kHz and 48 kHz.

Furthermore, please select in the drop-down-field ‘Input’ the corresponding audio input for the talkback function. If you supply the DEC-300™ with the audio signal from a microphone, you must select in the drop-down-field ‘Input’ the parameter ‘MIC’. If you supply the DEC-300™ with a line level signal (e.g.: the audio signal from a DVD-Player), you must select in the drop-down-field ‘Input’ the parameter ‘LINE’.

You can also set the gain in the fields ‘LineIn Gain’ and ‘MicIn Gain’ for the corresponding audio input, which you have set in the ‘Input’ drop-down-field.

The DEC-300™ is totally configured for a talkback session now. As next you must configure the ENC-100™ webpage. At the ENC-100™ encoder side, you must configure in the ‘Talkback’ field the sample rate, which you have selected on the decoder side. Furthermore you can also set the output gain level in the ‘LineOut’ field and you can mute the audio of the talkback session by enabling the ‘mute’ checkbox.

Now, you can talkback to your desired ENC-100™. To stop the talkback session, please enter ‘0.0.0.0’ in the ‘Talkback IP’ field of the DEC-300™.

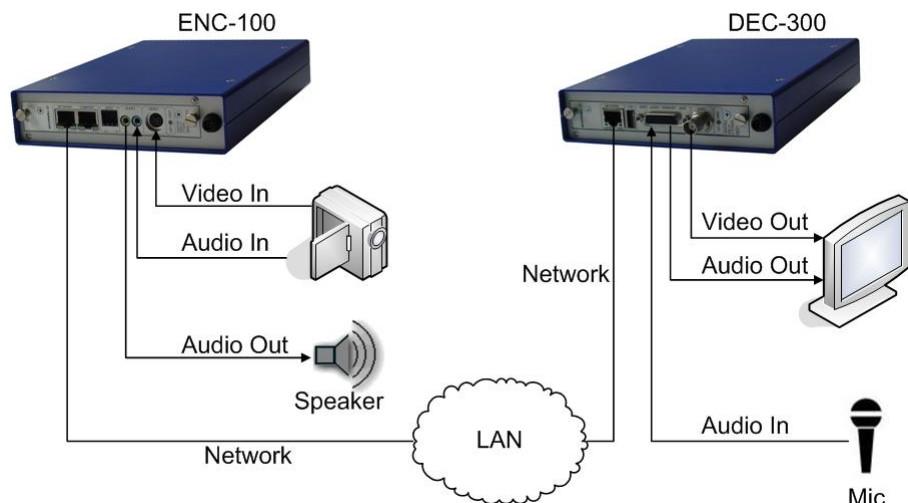


Figure 33: Talkback connection between DEC-300™ and ENC-100™ in Full Duplex Mode

4.3 TCP Streaming

If in your network occurs packet loss, jitter etc., we recommend using the connection-oriented protocol TCP. TCP provides a point-to-point connection (unicast) for applications that require reliable communications. If the TCP connection is established, then the data will be streamed in the same order as it was sent from the encoder. Furthermore, lost packets can be retransmitted via TCP.

The ENC-200™ and ENC-300™ support TCP streaming in connection with the DEC-300™.

To use TCP streaming on the ENC-200™ in connection with the DEC-300™, please be sure that your encoder has the firmware version 0.9.29 or higher, because this firmware version is necessary for TCP streaming.

To use TCP streaming on the ENC-300™ in connection with the DEC-300™, please be sure that your encoder has the firmware version 2.06_w40 or higher, because this firmware version is necessary for TCP streaming.

TCP streaming is based on the client/server architecture. For TCP streaming with the ENC-200™/ENC-300™ to DEC-300™ it exists two possibilities:

- For TCP streaming you can configure the ENC-200™/ENC-300™ as a server and the DEC-300™ as a client.
- For TCP streaming you can configure the ENC-200™/ENC-300™ as a client and the DEC-300™ as a server.

The ENC-200™/ENC-300™ and DEC-300™ configuration changes depending on which client/server possibility do you choose. So, the following subchapters describe the ENC-200™/ENC-300™ and DEC-300™ configuration for the two possibilities to make a TCP connection.

4.3.1 TCP configuration: ENC-200™ is the Server

Follow the steps below, to create a TCP connection at which the ENC-200™ is the server:

- Please open the **ENC-200™** webpage, go to the **ENCODER > SETTINGS** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/SERVER’.
- Go to the **ENCODER > DESTINATION** webpage of the ENC-200™ and enter in ‘Port’ field a port number which is not blocked (e. g. 1234). The ENC-200 listens at this port number and as soon as a TCP request is sent by the decoder, the encoder negotiates with the decoder about a new port number.
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-200™ and enter a value in the ‘Sendbuffer Size’ field (e.g. 250000). The ‘Sendbuffer Size’ specifies how much TCP data are maximal stored at the sender side (at the encoder side). The higher the value, the more network problems can be absorbed, but the higher is the delay at the decoder in error case. After an error case, the delay decreases again. The delay increases only, if an error occurs in the network. That means: If no network problems occur, the delay does not increase, even though a high value is set in the ‘Sendbuffer Size’ field.
- Please open the **DEC-300™** webpage, go to the **DECODER > SOURCE** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/CLIENT’.
- At the **DECODER > SOURCE** webpage of the DEC-300™, please enter in the ‘IP address’ field the IP-address of the ENC-200™ (e. g. 172.16.20.100). Note: TCP supports only unicast.
- Remain at the **DECODER > SOURCE** webpage of the DEC-300™ and enter in the ‘Port number’ field the same port number, which you have entered in the ENC-200™ (e.g. 1234).

Now the ENC-200™ and the DEC-300™ are configured for a TCP-connection.

4.3.2 TCP configuration: ENC-300™ is the Server

Follow the steps below, to create a TCP connection at which the ENC-300™ is the server:

- Please open the **ENC-300™** webpage, go to the **ENCODER > DESTINATION** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/SERVER’.
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-300™ and specify in ‘Max Clients’ field the maximum number of allowed decoder clients for the TCP connection. Maximum 5 decoder clients are possible. This field has only an effect when the ENC-300 is the ‘TCP/SERVER’.
- At the **ENCODER > DESTINATION** webpage of the ENC-300™, please enter a value in the ‘Send Buffer Size’ field (e.g. 250000). The ‘Send Buffer Size’ specifies how much TCP data are maximal stored at the sender side (at the encoder side). The higher the value, the more network problems can be absorbed, but the higher is the delay at the decoder in error case. After an error case, the delay decreases again. The delay increases only, if an error occurs in the network. That means: If no network problems occur, the delay does not increase, even though a high value is set in the ‘Send Buffer Size’ field.
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-300™ and enter in ‘Port’ field a port number which is not blocked (e. g. 1234). The ENC-300 listens at this port number and as soon as a TCP request is sent by the decoder, the encoder negotiates with the decoder about a new port number.
- Please open the **DEC-300™** webpage, go to the **DECODER > SOURCE** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/CLIENT’.
- At the **DECODER > SOURCE** webpage of the DEC-300™, please enter in the ‘IP address’ field the IP-address of the ENC-300™ (e. g. 172.16.20.100). Note: TCP supports only unicast.
- Remain at the **DECODER > SOURCE** webpage of the DEC-300™ and enter in the ‘Port number’ field the same port number, which you have entered in the ENC-300™ (e.g. 1234).

Now the ENC-300™ and the DEC-300™ are configured for a TCP-connection.

4.3.3 TCP configuration: ENC-200™ is the Client

Please make the following steps, to create a TCP connection at which the DEC-300™ is the server:

- Please open the ENC-200™ webpage, go to the **ENCODER > SETTINGS** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/CLIENT’.
- Go to the **ENCODER > DESTINATION** webpage of the ENC-200™ and enter in the ‘IP address’ field the IP-address of the DEC-300™ (e. g. 172.16.20.200). Note: TCP supports only unicast.
- At the **ENCODER > DESTINATION** webpage of the ENC-200™, please enter in ‘Port’ field a port number, which is not used in the network and which is not blocked (e. g. 1234).
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-200™ and enter a value in the ‘Sendbuffer Size’ field (e.g. 250000). The ‘Sendbuffer Size’ specifies how much TCP data are maximal stored at the sender side (at the encoder side). The higher the value, the more network problems can be absorbed, but the higher is the delay at the decoder in error case. After an error case, the delay decreases again. The delay increases only, if an error occurs in the network. That means: If no network problems occur, the delay does not increase, even though a high value is set in the ‘Sendbuffer Size’ field.
- Please open the **DEC-300™** webpage, go to the **DECODER > SOURCE** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/SERVER’.
- Remain at the **DECODER > SOURCE** webpage of the DEC-300™ and enter in the ‘Port number’ field the same port number, which you have entered in the ENC-200™ (e.g. 1234).

Now the ENC-200™ and the DEC-300™ are configured for a TCP-connection.

4.3.4 TCP configuration: ENC-300™ is the Client

Please make the following steps, to create a TCP connection at which the DEC-300™ is the server:

- Please open the ENC-300™ webpage, go to the **ENCODER > DESTINATION** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/CLIENT’.
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-300™ and enter in the ‘IP address’ field the IP-address of the DEC-300™ (e. g. 172.16.20.200). Note: TCP supports only unicast.
- At the **ENCODER > DESTINATION** webpage of the ENC-300™, please enter in ‘Port’ field a port number, which is not used in the network and which is not blocked (e. g. 1234).
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-300™ and enter a number in the ‘Send Buffer Size’ field (e.g. 250000). The ‘Send Buffer Size’ specifies how much TCP data are maximal stored at the sender side (at the encoder side). The higher the value, the more network problems can be absorbed, but the higher is the delay at the decoder in error case. After an error case, the delay decreases again. The delay increases only, if an error occurs in the network. That means: If no network problems occur, the delay does not increase, even though a high value is set in the ‘Send Buffer Size’ field.
- Remain at the **ENCODER > DESTINATION** webpage of the ENC-300™ and enter in ‘Stop Interval’ field the time interval in sec. for reconnecting in error case. This field is active when ‘TCP/CLIENT’ or ‘UDP’ is used as ‘Transport Protocol’ in the ENC-300™.
- Please open the DEC-300™ webpage, go to the **DECODER > SOURCE** webpage and select in the ‘Transport Protocol’ drop-down field the variable ‘TCP/SERVER’.
- Remain at the **DECODER > SOURCE** webpage of the DEC-300™ and enter in the ‘Port number’ field the same port number, which you have entered in the ENC-300™ (e.g. 1234).

4.4 Resetting to Factory Default

The DEC-300™ (blade based and chassis based) can easily be returned to its factory default values. In order to do these please power down the decoder chassis.

Please execute the following steps to reset the DEC-300™ to the factory default settings:

Steps for the DEC-300™ blade based version which is operated in the FR-610 chassis:

- Remove the DEC-300™ blade gently and carefully from the chassis.
- Hold the blade as shown in Figure 34, with the video input pointing to the left.
- Locate the green pin connector and the jumper which is placed on the middle pin pair of the green pin field.
- Place the jumper now on the left pair of the green pins, see Figure 34.
- Insert the DEC-300™ blade gently into the chassis and turn the power on.
- Wait for 2 minutes.
- Power down the chassis and carefully remove the blade once more. Return the jumper to its original position, i.e. onto the middle pin pair of the green pin field.
- Insert the DEC-300™ blade gently into the chassis, connect the network cable and all audio/video cables and turn the power on. All configuration settings except the network settings of your decoder blade have been returned to its factory defaults.

Steps for the DEC-300™ PORTABLE (chassis based version):

- Please remove only the blue top cover of the DEC-300™ PORTABLE chassis.
- Hold the opened chassis with the video input pointing to the left.
- Locate the green pin connector and the jumper which is placed on the middle pin pair of the green pin field.
- Place the jumper now on the left pair of the green pins, see Figure 34.
- Turn the power on.
- Wait for 2 minutes.
- Power down the chassis. Return the jumper to its original position, i.e. onto the middle pin pair of the green pin field.
- Close the chassis with the blue top cover, connect the network cable and all audio/video cables and turn the power on. All configuration settings except the network settings of your decoder blade have been returned to its factory defaults.

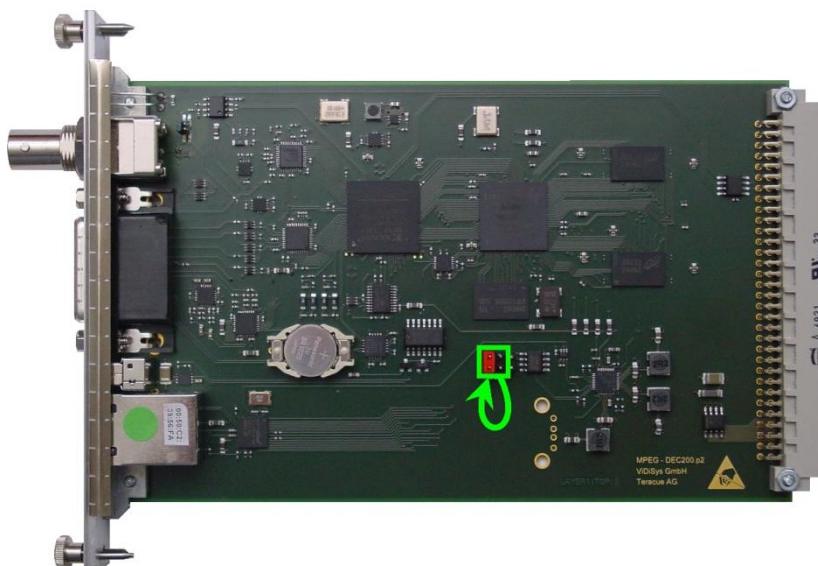


Figure 34: DEC-300™ Blade

4.5 Restarting the DEC-300™

If a DEC-300™ is not approachable anymore, you can restart the DEC-300™ by using the restart switch. The restart button is placed in a hole on the front panel and it is located into the 'O' of the lettering 'NETWORK', see Figure 35. To press the restart button, you need a long thin object with which you can put it through the hole and with which you can press the restart button. After you have pressed the button, the DEC-300™ restarts.

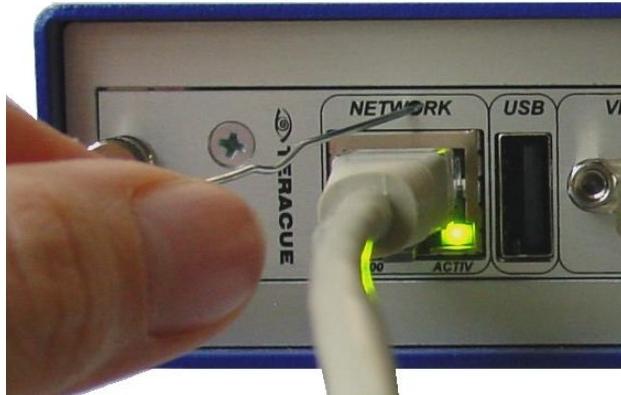


Figure 35: Restarting the DEC-300™ by using the restart button

5. CE, FCC conformance



The DEC-300™ is labeled with the CE and FCC seal.
The DEC-300™ is in conformity with the following standards:

EN 55103-1

Electromagnetic Interference - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional use - Part 1: Emissions

EN 55103-2

Electromagnetic Susceptibility - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional use - Part 2: Immunity

EN 55022

Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment

6. Restriction of Hazardous Substances Directive (RoHS)

The DEC-300™ is manufactured according to the RoHS Directive. The Directive on the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) has been passed as a law by the European Union. It affects manufacturers, sellers, distributors and recyclers of electrical and electronic equipment containing hazardous substances as lead, cadmium, mercury, hexavalent chrome, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

After July 1, 2006 the use of these materials will be banned in new products sold in Europe.
Since beginning of 2005, Teracue AG began the process of redesigning and converting all of its products to not contain any of the listed materials. All new products sold by Teracue will be fully RoHS-compliant by July 1, 2006.

7. Waste Electrical and Electronic Equipment Directive (WEEE)



The WEEE Directive has been passed to reduce waste arising from electrical and electronic equipment. It encourages reuse, recycling and other forms of recovery. Customers and end-users of electronic equipment in the EU can therefore play an important role in reducing WEEE and saving the environment by separating out WEEE and disposing of it properly.

Teracue AG is a registered WEEE participant since 2004. Within Germany, Teracue is registered under the WEEE Number: DE10642708. German customers and end-users are required to discard products marked with the WEEE symbol (crossed out trash bin) at local resource collection points. Do not dispose products marked with the WEEE symbol in domestic refuse.

Every country within the EU has defined different directives and methods for the collection of electronic materials to ensure the WEEE Directive. Please follow the national guidelines that have been identified for your country. For more information about waste disposal of your old electrical and electronic equipment, please contact your local city office, your waste disposal service or the company where you bought the product.

8. Technical Specification

DEC-300™:

DEC-300™: H.264 SD/HD and MPEG-2 SD/HD decoder with analogue video output and SDI output, embedded audio supported.

Decoding Specifications:

Standards:	PAL, NTSC, 720p 50/60, 1080i 50/60, 1080p 25/30
Video Outputs:	HD/SD-SDI: 0,8 Vpp, 75 Ohm (BNC, embedded audio support)
Break-out cable outputs:	Composite: 1 Vpp, 75 Ohm S-Video: 1 Vpp (Y), 0,3 Vpp (C - Pal), 0,286 Vpp (C - NTSC), 75 Ohm Component: 1 Vpp (Y), 0,7 Vpp (PBPR) , 75 Ohm
Video Output Resolutions:	Full D1: 720h x 480/576v, Half-D1: 352h x 480/576v, CIF/SIF: 360/384h x 288/240v, QCIF: 176h x 144/120v, 720p 50/60, 1080i 50/60, 1080p 25/30
Audio Outputs:	Unbalanced analogue stereo, consumer line level
Audio Inputs (Talkback):	Analogue stereo, consumer line- and MIC-level
Video Codecs:	<u>MPEG-2 (ISO/IEC 13818-2):</u> Main Profile at Main Level (MP@ML), 4:2:0 High Profile at Main Level (HP@ML), 4:2:0 <u>MPEG-4 AVC/H.264 (ISO/IEC 14496-10):</u> Main Profile at Level 3.0 (MP@L3), Baseline Profile at Level 3.0 (BP@L3), 4:2:0, High Profile at Level 4 (HP@L4) ISO/IEC 13818-1 Transport Streams Elementary A/V
Stream types:	MPEG-1 Audio Layer 1, 2 (ISO/IEC 11172-3 Layer 1, 2) MPEG-4 AAC LC (ISO/IEC 14496-3)
Audio Codecs:	

I/O Specifications:

Network:	10/100TX Ethernet, RJ45, half/full duplex, Auto-sensing
Streaming traffic:	Unicast and Multicast traffic supported, TCP error correction
IP Protocols:	HTTP (Web Browser), TCP/IP Control Protocol, UDP/TCP Streaming, IGMPv2, SNMP*, DHCP
RS-232/422 port:	RS-232 connection via console (remote control for non IP devices via TCP/IP RS-232/422 command tunnelling*)
GPI in*:	1 INPUT, isolated*
GPI out:	1 OUTPUT, isolated*

Environmental:

Agency Approvals:	CE, RoHS compliant
Humidity:	Up to 90%, non-condensing
Temperature:	-25 to +45°C environment temperature; fan less when operated as - PORTABLE
Blade weight:	Approx. 130 grams
Blade dimensions:	(H/W/D) 20mm x 130mm x 190mm, Europe Card (160mm x 100mm, 3HE), Conform to IEC60297-3-4
Power:	5V(DC) ±10% / 8W per blade
PORTABLE weight:	Approx. 700 grams
PORTABLE dimensions:	(H/W/D) 280mm x 104mm x 191mm
Limited Warranty:	1 year standard limited warranty. Extensions for up to 5 years available.

Order Information:

DEC-300:	H.264 SD/HD & MPEG-2 SD/HD decoder blade with SD/HD-SDI-, embedded audio-, analog video/audio output.
DEC-300-PORTABLE:	H.264 SD/HD & MPEG-2 SD/HD portable decoder device with SD/HD-SDI-, embedded audio-, analogue video/audio output. Including power supply.
BREAKOUT-CABLE-S:	YC (MiniDIN), CVBS (RCA), Analogue Audio In (MiniJack), Analogue Audio Out (RCA)
BREAKOUT-CABLE-P:	YPbPr, YC, CVBS, Audio Out/In (RCA), GPI In/Out (Sub-D 9pin), RS-232/422 (Sub-D 9pin)

Blade-Chassis:

FR-610:	1RU Rack-Mount-Chassis for max. 6 blades.
FR-610:-DPS	1RU Rack-Mount-Chassis for max. 6 blades.
FR-2000-24:	4RU Rack-Mount-Chassis for up to 21 blades (depends on blade combination) with redundant power supply.

COMPLEMENTARY PRODUCTS:

ENC-300-DVI:	H.264 HD/SD encoder blade with DVI/HDMI input. Also available as -PORTABLE encoder device.
ENC-300-HDSDI:	H.264 HD/SD encoder blade with SDI, PAL/NTSC, Composite, S-Video, Component or analog VGA input. Also available as -PORTABLE encoder device.
MC-ROUTE-1RU:	1RU appliance for live stream routing and bridging of unicast and multicast streams.

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9. Known Issues

- All German "Oeffentlich Rechtliche" HD TV programs show artefacts.
- No support for MPEG4 audio AAC streams in LOAS or LATM format
- No support for Intra coded MBAFF IDR frames. These frames are decoded as uniform colour planes. Colour depends on video content. So with bright content the erroneous frames look like a flash, with dark content one might not even recognize those frames.
- When downgrading to a "non-IEEE802.1x" aware firmware, it might be necessary to do a factory-reset to regain network access.
- If a GOP has more than two B-frames, artefacts are visible.